

American Forestry

VOL. XVIII

AUGUST, 1912

No. 8

FORESTRY IN FORMOSA

By R. KANEHIRA

TO the southwest of the mainland of Japan, with the Loochoo group as stepping stones leading in an almost unbroken line, lies an island which Portuguese mariners who sailed down its west coast, in the sixteenth century, gave the name of "Hha Formosa" (beautiful Isle); which is the name in European literature.

On the east coast the waves of the boundless Pacific are constantly washing the base of the lofty cliffs, some of them 6,000 feet high. On the south, the island is linked to the Philippines through the Bashee Channel, while on the west it is separated from the mainland of China by the Formosan Channel. This island together with the Pescador and other smaller islands adjoining it, lying between 25° 30' and 21° 40' north latitude, and 119° and 122° 10' E. L., was ceded to Japan by China in 1895, as a result of the war.

The island extends from north to south in the shape of a leaf 264 miles long and 80 miles wide. A chain of mountains with *Sylvia* in the north and *Morrison* in the south, with their respective heights 11,470 and 13,880 feet, and many more high peaks between all covered with everlasting verdure, runs north to south through almost the entire length of the island. Under these geographical circumstances, the principal forests are found in the Central Chain of mountains, the savage district, while forest in the district which are under the Government administration were cut down or exploited or were brought to ruin on account of camphor manufacturing during the Chinese régime, so that none of these forests retain their characteristic sylvan features.

When the area of forest is figured

up according to the topography and the distribution of forests, it may be found that the total extent covers almost 7,107,000 acres, *i. e.* 67% of the total area of the entire island. Of these about 4,300,000 acres are in the savage district.

Topography of the island may be divided into two parts, mountain and plain districts. The former is the central range of mountain almost entirely of paleozoic formation, which runs from the north to the south, the latter lie mostly on the west sides of the mountain, practically a plain of alluvial formation furrowed by shallow creeks and rivers with some small hills and sandy dunes on the seashore.

Though the island is located between the tropical and subtropical zones, the climate presents great variety according to latitude. Thus we see tropical plants in the plain, while we have alpine plants on the peaks. As regard forests, the plain districts are mostly cultivated land, raising rice, sugar, tea, etc., and we do not find much forest there except a scattering of fuel trees such as *Acacia*, *Nephelium*, *Ficus*, and palms bamboos, etc. The mountain district is extremely variable and may be conveniently divided into three zones, the lower part of the mountains, the zone of evergreen broad-leaved trees; Coniferous forest; and the grassland on the summit. The evergreen broad-leaved tree region is almost entirely a mixed stand of many kinds of *Querci* and lauraceous plants.

The conifer region commences at an elevation of about 6,500 feet. The most predominating trees in this region are *Chamaecyparis*, *Tsuga*, *pinus*, and other needle-leaved tree. *Chamaecyparis*, commonly called cedar in America, is the most valuable and important



SOME OF THE SAVAGE PEOPLE WHO LIVE IN THE INTERIOR OF FORMOSA AND WHOSE HOSTILITY TO THE JAPANESE MAKES FOREST WORK IN THE INTERIOR DIFFICULT AND DANGEROUS.



THE JAPANESE EXPERIMENTAL STATION OF FORESTRY RECENTLY ERECTED BY THE GOVERNMENT IN FORMOSA.



A TYPE OF ONE OF THE MANY CAMPHOR MANUFACTURING KILNS WHICH ARE FOUND IN THE FORESTS OF FORMOSA.

tree in the island and is wonderfully large, sometimes attaining a diameter of even 20 feet or more, and producing the finest timber material. "*Taiwan-Sugi*" (*Taiwania cryptomerioides*) not only peculiar in botanical interest as an endemic genus, displays a fine feature of the forest. Here also those rare trees such as *Keteleelia Davidiana*, *Cunninghamia Konishii*, and *Pseudo-tsuga Japonica* are found.

The grass land of the summits commences at about 12,000 feet and as is usually the case plays no important part in forestry.

Now to sum up the different kinds of commercial trees, they are:

Conifers—*Chamaecyparis* (2 kinds),

abundant; *Taiwania cryptomerioides* (endemic), fairly abundant; *Tsuga formosana*, fairly abundant; *Podocarpus* (several kinds), fairly abundant; *Libocedrus macrolepis*, fairly abundant; *Pinus* (several kinds), abundant.

Evergreen broad-leaved tree—*Camphor tree*, abundant; *Machilus* (several kinds), abundant; *Quercus* (several kinds), abundant; *Pasania*, abundant; *Alnus*, abundant; *Acacia* (2 kinds), abundant; *Nephelium*, abundant.

Beside these, there may be included *Keteleelia Cunninghamia*, and many kinds of hard woods.

The bamboo is an important item in the island as it is used for building material, fence, wall frames, carrying



A VIEW OF A DENSE EVERGREEN BROAD LEAVED FOREST IN FORMOSA.



A SECTION OF ONE OF THE MAGNIFICENT BROAD LEAVED FORESTS WHICH ARE FOUND
IN FORMOSA.



THE "GOD TREE" IN THE FOREST OF ARISAN, FORMOSA.
THE DIAMETER OF THIS TREE IS ABOUT TWENTY-TWO
FEET.

sticks and furniture making. They are found over the whole island except in the mountain districts.

Since seventeen years ago when Formosa was ceded to Japan, what has the Government done to the forests of Formosa? The great difficulty in exploring the forests of the island is that most of the commercial forests are found in the savage districts, where the inhabitants have a very cruel habit of head-hunting, as is also found in some islands of the South Sea. The savage people extend over nearly 2,900 square miles; covering perhaps 60 per cent of the island and there is great necessity felt for defence against them. We are resorting to various measures of bringing

pressure upon them and of gradually inducing them to submission.

So the more this region is tranquilized, the more the timber industry will spring up.

At present, there does not exist any special work on the forestry of this island excepting those under described.

One of the most important items of Formosan forestry is the camphor industry. The trees are found usually in mixed forest together with other evergreen broad-leaved trees, and most of them are now in the savage districts.

The camphor product here is practically the monopoly of the world, and now forms one of the principal exports of the island. It has been in the Gov-



JAPANESE FOREST DEPARTMENT OFFICIALS IN UNIFORM
AND COOLIES IN THE BAMBOO STAND NEAR ARISAN, FORMOSA.

ernment monopoly since 1899. In the Chinese régime, the crude and wasteful method of manufacture adopted by the Chinese camphor producer has been replaced by the advanced Japanese process, while in order to keep up a sufficient supply of material, efforts are being made towards propagation of the tree, by establishing nurseries in various parts of the island, the camphor forest thus being maintained with splendid results.

The *Arisan* forest timber industry is a rather peculiar phenomena that up to this time Formosa is importing a great deal of timber from the mother country, notwithstanding the fact that she has a considerable amount of commer-

cial forests. It is due to the fact that the island is topographically very steep and most of the forest being found in the savage district, it is consequently very difficult of access.

One of the most important timber fellings which is going to be made by the Government is the *Arisan* forest. This forest is particularly well known to the public. It is very dense virgin forest, perhaps unique in the size of the trunks and richness of its growth.

The area of the forest is only about 27,000 acres, but it contains 106 million cubic feet of conifers and 112 million cubic feet of hardwoods.

We are now going to explore the forest, by establishing a railway to the



TYPE OF THE HEAD HUNTERS FREQUENTING THE MOUNTAINS OF FORMOSA AND AGAINST WHOM THE JAPANESE FORESTERS HAVE TO CONTEND.

elevation of 7,000 feet and using modern methods for cutting and transporting the timber. We do not hesitate to declare that this forest produces such trees that both in shape and quality they will hardly find a rival.

Besides these we have lumbering on a small scale in many other places, in case of fuel trees for the sugar factories and some other kinds of hardwoods for cabinet work, of which the most important trees are: *Libocedrus*, *Diospyros*, *Biochofia*, *Pistacia*, etc. One thing which I ought not to omit to mention here is the pulp making from bamboos. We have a great deal of bamboo stand in the central part of the island, and recently a large pulp mill

has been established for that purpose. This will, I think, be the very first bamboo pulp mill in the world.

While the economic importance of the natural forest is being increased by their exploitation, it is important at the same time that secondary forest should take their place. The necessity, therefore, of the utilization for this purpose of mountain districts which were left to run wild in the administrative section of the preservation of the camphor forests, of planting trees in the most needed places as a preventive measure against flying sand, and in order also to maintain the purity of the mountain heads, caused the Government to take over large areas of land for the pur-



A PORTION OF THE VIRGIN FOREST OF ARISAN, FORMOSA.

poses of planting and reafforestation. There is now camphor forest of about 9,000 acres planted by Government and 15,000 acres by the people and beside this we have planted 10,000 acres in the reserve forest.

As the forest of the island is quite peculiar to that of the mother country both in species of trees and character, in order to investigate these factors we established here the Experimental Station of Forestry in 1911. The principal work which is now being done is the examination of the physical properties of Formosan trees and experiments on raising seedlings both of Formosan

trees and of foreign economic plants are also being made.

There are quite a number of species of economic tropical plants, which it seems possible to successfully acclimatize, such as fibre, spice, oil, rubber, etc. The Chinese are very ignorant of all idea regarding tree planting. Very few trees are seen in their villages and towns, either shade-bearing or garden trees. We, therefore, raise many seedlings here and distribute them sometimes for sale, sometimes free of charge, and sometimes we raise seedlings of these for afforestation.

THE FORESTRY OF FRANCE

By WARREN H. MILLER, M. A.

IN a recent paper I gave a brief review of the forest practice of Germany as exemplified by a comprehensive inspection undertaken last year, in which the principal silvicultural areas of Germany were revisited after an absence of twenty years. Owing to the combined influence of species, soil and climate, clear cutting and replanting with seedlings may be said to be by far the predominating method of forest management of modern Germany, though at the present moment there is considerable agitation in favor of a return to the methods of natural regeneration originally devised by the Germans and extensively developed in France. However, as far as actual practice goes, the clear cutting and planting system is virtually the only method used for conifers. Out of over two hundred coniferous forests I saw but three that were by natural regeneration, and in these the trees were crooked and the thinnings commercially valueless except for cord wood. In the deciduous forests of the upper Rhine and Westphalia, natural regeneration was of course used, owing to the fact that the root diffusion of these species makes their planting expense higher than with any form of seeding.

In spite of the tendency of some of our best-known authorities to belittle the achievements of the French foresters, I feel sure that a later and more comprehensive judgment will bring a universal acknowledgment that the world owes much to France's contributions to the practice of silviculture and that America in particular will find a great deal that is adaptable to our forest management. Two years ago I undertook an extensive course in French forest practice under the guidance of Prof. R. Hickel, of Versailles (whose latest book *Semis et Plantules* well deserves a translation into English), visited a number of French For-

ests, both standard and coppice, and became thoroughly conversant with what may be termed the French forest specialties.

France has made her most striking successes on a large scale with the following silvicultural operations:—Standard forest with natural regeneration by seeding cuts; standard coppice with balivage regeneration; reforesting mountain slopes; reforesting waste heather lands; arresting sand dune invasions. All these have been successfully done on a tremendous scale by the foresters of France and the technique thus developed must be considered as her contribution to the world's practice of forestry. In this article my aim will be to merely sketch these operations in order to give the reader a general idea of them in the brief space available.

STANDARD FOREST

A glance at the forest map of France herewith will show the immense preponderance of deciduous species, the oaks (five species), beech, hornbeam, ash, elm; and then, in the mountains of the Vosges, Jura, Provençal Alps and Pyrennees, fir and beech, spruce, and Austrian pine. Sylvester pine occupies the newly reforested Landes, the garrigues and all sandy basins too poor to grow hard woods, while maritime pine and Alep pine take up the south and west coasts. All the basin of the Seine is robur and peduncle oak, both coppice and high forest (Bellême, Berce, Sarce, Compiègne, Villepreu-las-Clayes, Champenoux, etc.); the North country is hornbeam and Brittany is beech. It is but logical, then, that the *futaie régulière* or standard forest, with regular regeneration, should have been developed on a great scale and even extended to the conifers, which are invariably planted in Germany.



Photo by Warren H. Miller.

THE FORESTERS TASK IN THE TERRES NOIRES.

The principles of natural regeneration are, first, the admission of sunlight to the forest floor in sufficient quantity to germinate the crop of seeds; second, the maintenance of a suitable shade over the seedlings resulting from a fall of seeds; and, finally, the removal of the last of the old stand. These operations are accomplished in practice as follows:—The forest is divided into as many cantons as the number of years of the revolution selected (70-120) and a seeding cut is made in one canton each year, cutting from east to west. The severity of the seeding cut is determined by the species and the first canton in the series is selected that has a seed year due that year. With the oaks enough trees are taken to leave the balance on 100 ft. centers; sylvester pine at the other extreme would be left on 200-250 ft. centers. The forester sees to it that these seed trees are all sound, healthy, and capable of shedding an abundant crop of acorns, beech-nuts, hornbeam, samaras or pine wing-seeds that fall (whatever may be the species),

and the following spring, since the forest floor is warm and sunlit, an abundant crop of seedlings comes up, which gives a thick fur of young trees of the same species as the original forest overhead. If not completely successful, a second crop of seeds is allowed to fall before proceeding to the secondary cut. This removes half of the seed trees, leaving enough protection to guard the young trees from sun-scorch and early frosts. Five years later they have grown so as to no longer require protection, and the terminal cut is then made which takes the last of the old stand. The reproduction is now complete and it has cost nothing beyond a slight increase in logging expense due to cutting over the same canton three times instead of once as would have been the case with clear cutting. But the cost of planting, not less than \$5 an acre, has been saved.

Continuing the régime of the Standard forest, the young growth is left to itself for about fifteen years after the terminal cut. It then receives its first



Photo by Warren H. Miller.
ONE-HUNDRED-YEAR FIRS IN THE VOSGES FOREST, 96000 BOARD FEET PER ACRE.

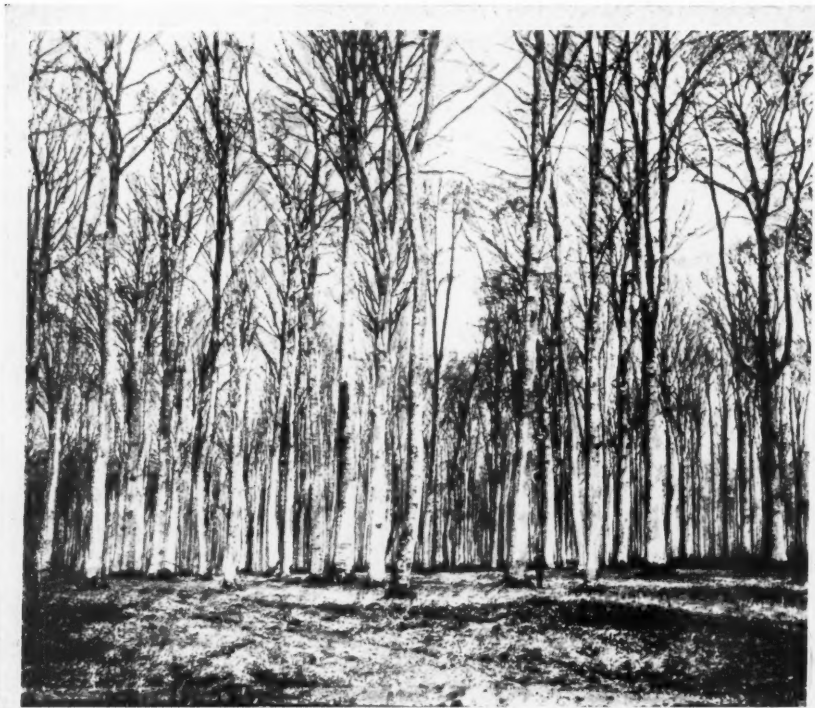


Photo by Warren H. Miller.

PURE OAK FOREST, CANTON OF CLOS.

thinning, taking out from one-half to two-thirds of the thick growth. Periodic thinnings follow at intervals of ten years, the general principle being to keep the tops of the dominant trees so that they will just meet when the next thinning comes due, and to keep enough of the sub-stage trees to protect the trunks of the first-class ones from the sun. None of these thinnings are wasted,—in fact nothing is ever wasted in France,—and the income from all classes of thinnings amounts to two-fifths of the market value of the final crop. The thicket-stage trimmings compete direct in the markets with coppice products, and the others furnish lumber of increasingly valuable sizes.

Arrived at the end of the revolution, which is at present taken at 60 years for sylvester pine, 75 for oak, and 100 for fir, the seed cut is made in the nearest seed year for that canton (they occur every two to five years for most species) followed by the secondary cut,

and then the terminal cut when the new growth on the canton is established. In a French standard forest of an hundred cantons, each year sees one terminal cut, one secondary cut, one seedling cut and ten thinning cuts; in all thirteen cantons being cut over, so that there is plenty of business going on even though the cantons may be of only a few hectares area each.

As the system is one which we will adopt in America for nearly all forests not in close touch with rail facilities (such as replanted barrens and worn out pasturage), I will give here a few generalizations as to how to set about converting a wild American forest into a French Standard forest. The first desideratum is uniformity of species, wherefore when you cut cord wood from your woodlot or forest, replant the spot liberally with the species you have selected, preferably the dominant species already placed there by nature as survival of the fittest. The second

consideration is uniformity of age for the trees on each canton. A fifty-year American white oak is 12 to 13 inches in diameter, and at 75 years it will reach 19-20 inches, giving first-class new lumber. Having divided your forest into approximately equal areas as determined by the lay of water courses, ravines, logging roads, etc., arrange your thinning cuts and replantings so as to give you an unbroken series of ages year by year. If there are sufficient seed trees year by year on the spot, you can go direct to standard forest by making a seeding cut each year on each successive canton, eking out any bad spots with hand planting. Doing one canton each year you will have three cuts a year until the fifteenth year when your first thinning cuts begin. Any American hardwood forest can be thus converted into standard forest provided that enough seed trees are already on the sight. With conifers, I would advise underplanting for white pine or clear cut and replant with three-year nursery transplants for Scotch and Norway pine.

The French have developed coppice management to a science far in advance

of the other nations. In Italy, America and other coppice countries, simple coppice only is used, with no provision for future regeneration, but in France the predominating system, both in public and private coppice, is "standard coppice" with complete systems of "*baliveaux*," "*modernes*" and "*anciens*," as the seeding coppice trees are called.

This type of forest is based on the principle that certain species of trees, notably oak, chestnut, maple and ash have the property of sprouting from the stump, so that you have a forest of straight vertical branches without any trunks. As the root system is quite as large as with standard trees it is natural that the yield in branch wood is very large and sustained and the sprouts are straight enough to be valuable commercially. In twenty years a crop of four-inch shoots twenty feet long, six to ten to the stump, is available. All the shoots but one are taken, and in twenty years more a second crop has grown from the same stump. The sprout left from the first sprout is called a *baliveau* and serves not only for a future seed tree but for shade and protection to the young sprout. Left again



REFORESTING MOUNTAIN SLOPES. Photo by Warren H. Miller.



SPRUCE FOREST IN THE JURA.

on the stump it is called a *moderne* and is 40 years old and about 8 inches in diameter. At the sixtieth year a third crop of sprouts is taken and the *moderne* becomes an *ancien* and bears seed abundantly. The *anciens* start a thick growth of seedlings all over the forest floor and after two more crops of sprouts the original stumps die but the seedlings have grown to 40-year trees, which are forthwith cut to stump and the *anciens* harvested, putting the forest in shape for coppice again. Horse chestnut coppice is usually managed in "simple coppice" with poplar balivage, that is, the whole crop of sprouts is taken every twenty years and the poplars held for shade.

The yield in poles, tan bark and lattice stock from coppice management is tremendous and the returns are quick, so that in Central France, where there is a ready market for cordwood, turning wood, tool handles and tan bark, coppice management is very extensive. It requires a rich clay soil as the roots feed excessively. If many of the stumps are allowed to produce *modernes* and *anciens* the sprout crop will suffer from shade, but more heavy timber will

be yielded so that in the judgment of the forester almost any yield desired for any particular market can be managed. In our own country native chestnut is the principal coppice crop, and telegraph poles, ties, and lumber for interior trim offers the best market, three or more shoots are allowed to grow to 10 and 12 inch poles per stump, yielding at the same time seed for regeneration.

REFORESTING MOUNTAIN SLOPES

The necessity for the hundreds of millions of francs that France has been forced to spend on this work had its beginnings in the orgy of unrestricted cutting which took place during the French Revolution and the Directory. Under the Bourbons the laws governing cuttings in private forests were severe and drastic, unnecessarily so, perhaps, so that, with the sweeping away of the monarchy and all its laws, all restraint was removed and an era of complete denudation of mountain forests set in. Furthermore, the herbage which sprang was given over to unrestricted pasturage so that neither seedlings nor bushes

nor even perennial weeds had a chance. The result was that over 9000 mountain streams in the Alps and the Pyrennees formerly steady in flow became raging torrents after every rain storm, the springs dried up, vegetation disappeared and the mountain slopes became mere arid sheds of detritus, loam and silt. Mountain real estate values shrivelled, the loss being something over three hundred billion francs and the flood and drouths in the low lands became an annual curse.

To date over three hundred million francs have been spent on reforestation and barrage and about 6000 torrential streams have been gotten under control. The procedure outlines as follows:—The first thing to do is to obstruct the flow in the torrent bed and reduce its velocity. A series of rough rock dams across the bed arrests this difficulty to form deposits of silt and mud. These *barrages*, so called, are planted with willow and alder shoots, forming living hedges which are carried far up the sides of the ravines. Next the mountain slopes are terraced by digging narrow horizontal ledges and planting seedlings in the banks formed by throwing the trench excavation down hill. The trenches are parallel and about 6 feet apart vertically. The species chosen depend almost exclusively upon maximum and minimum temperatures obtaining. In order of temperature—withstanding qualities they are: green oak, yew oak, pine Alep, Austrian pine, Cembro pine, from highest to lowest temperatures. The silt from the embankment above gradually fills the next trench below, but by the time the slope has been restored, the seedlings have formed an extensive root system and are able themselves to resist further erosion. As the plantation grows older it is managed strictly on the selection system. In the *Terres Noires*, where the soil base is black calcareous limestone, the case of complete soil denudation is exemplified, not even pasturage being left. In such cases the forester's first aim is to produce a thick covering of shrubs and weeds. All mountain slopes consist of a series of more or less vertical ravines with ridges or mountain backs in between. It is on these mountain backs that the



Photo by Warren H. Miller.
STANDARD COPPICE, CHAMPEROUX.

forester begins his first attack, for here the run-off is least severe. These slopes are planted with broom plant, Alpine heather, gorse and furze, which shrubs have been found to secure a foothold on dry, eroded soils more quickly and surely than any others.

RECLAMATION OF WASTE LANDS

The reclamation of the Landes of France constitutes another achievement of the French foresters which has added something like twenty million dollars to the land values of Southwestern France. Originally covered with forests, the denudation of the Landes in the 16th Century left nothing to take up the annual rainfall, so that without natural drainage the Landes soon degenerated into swampy moors, in which state they bid fair to remain indefinitely. However, at a cost of but 3 cents a square meter the French foresters reclaimed this entire area with a properly laid out system of drains. The sandy sections were planted in sylvester pine after several failures in maritime pine, and the better soils were sown with peduncle oak. The forest growth alone on the Landes is now estimated at over ten million dollars.

CONTROL OF SAND DUNES

The struggles of the French foresters against the invasions of the sand dunes along the southwest coast resulted in developing an admirable system of dune control, simple, logical and inexpensive. It was found that the only way to arrest sand invasion was at its source,—at the ocean shore line itself,—and it was also found that it was not a difficult matter to make the ocean build its own dune. Once having built a dune forty to sixty feet above sea level, further sand invasion would cease and plants and sedge could then be successfully grown upon the dune.

The method of procedure is as follows: At a calculated distance back from the beach a line of stakes is driven, carrying a woven wicker screen from four to six feet high. In a short time the sand drift has banked up solid to the top of the screen, making a long, gradual slope back to the shore. The stakes are now pulled up, advanced

some ten feet and the screen set up on top of the drift. If the screen is six feet high, a dune twelve feet high will have been formed by the time the sand has again drifted up to the level of the top of the screen. The stakes are again pulled up, advanced and set up on top of this drift and the process is repeated until in the course of several years a dune forty feet high has been erected. At this height the sand drift has reduced almost to nothing and the character of the deposits on the dune changes. More and more organic matter from the sea finds lodgment, and, not being buried under further drifts of sand, invites vegetable growth which soon appears from natural seeding. Sedge, sage, sand blackberry and other running vines appear and the forester encourages the growth with hand sowing until he has a green stable dune where once were continuous moving drifts of sand, rolling inland and burying whole forests to their treetops.

RANE GOING ABROAD

F. W. Rane, State Forester of Massachusetts, has been delegated by Governor Foss to represent the Commonwealth of Massachusetts at the Second International Congress of Entomology, which is to be held at Oxford, England, August 5 to 10, 1912. At the termination of the Convention, Mr. Rane will go on to the Black Forest of Germany to study forestry conditions and the gypsy moth question. He will remain abroad throughout the month of August.

SAVING NEW YORK'S ELM TREES

Park Commissioner Stover, of New York City, is doing everything in his power to save the elm trees in Central Park attacked by caterpillars, known to landscape gardeners as tussock moths.

"We are scraping and spraying the trees," said the Commissioner, "and we never cease our efforts to save a tree except when it becomes clear that the labor and expense are wasted—that it cannot be saved. When this appears another tree is planted in its place."

FIRE PROTECTION IN ALBERTA

The Canadian States are taking advanced grounds on the question of fire protection, especially with reference to forests, as indicated by recent reports of legislation from that section.

Railway companies operating in the province of Alberta are liable for fires in forests and elsewhere starting within 300 yards of their rights-of-way, both sides, according to a new act effective on the Canadian Pacific Railroad, July 5, and on the Canadian Northern and Grand Trunk Pacific lines, July 15. It is provided under the regulations, given out at Edmonton on July 3, that in the event a fire gains control the carrier company must fight it to the extent of ten miles, being responsible for the cost and the damage.



A ROAD ON THE GILA NATIONAL FOREST, NEW MEXICO, WHICH COST
\$466.00 PER MILE.

FOREST ROADS AND TRAILS

ERNEST WOHLLENBERG*

IN the past the construction of forest roads and trails was in the hands of individuals and private concerns and for that reason very little literature was published and only a small amount of data was collected. During the past few years the United States Forest Service has done a great deal of work in the development of the forests of the west, part of which consisted in building roads and trails. The development and protection of any forest region under forestry principles depends upon its accessibility, which means that roads or trails are necessary. Under the old methods of lumbering the land was devastated of its good timber or cut clean with no thought of the future, but now economic conditions have changed. The price of stumpage, the growing scarcity of standing timber and the common-sense conservation policies all demand better protection and closer utilization of the forest, and in order to obtain this the woods must be opened up by roads and trails. The immense forest fires in the Northwest during the summer of

1910 indicate one great necessity of having the forest accessible.

The search for material for this article has extended over the entire country, but very little literature could be found. Valuable information has been taken from notes on Professor Chapman's lectures at Yale University and from W. E. Herring's lectures given at the State University of Washington. An attempt was made to collect specific examples of roads and trails which have been built in all the different forest regions of the United States, but it was impossible to obtain information from some of the regions.

USES OF TRAILS

Trails are for the use of the general public and of forest officers. The first trails on the present forests in different parts of the country were built mostly by miners, homesteaders and stockmen. These trails were used entirely by the general public, and in this way the country was partially opened up and developed. The main object in build-



A FIRE LINE IN WISCONSIN, USED AS A ROAD.

ing these trails was accessibility. At present the main objects besides (1) accessibility, are, (2) administrative purposes, (3) routes for packing purposes (to mining camps, etc.), (4) pleasure (scenic trails), (5) fire lines, to a small extent, and (6) stock trails. The forest should be made accessible so that any part can be reached in a reasonable amount of time and routes of travel should be made for administration. Occasionally trails are built by private parties to provide a route for packing purposes, to remote mining camps. Scenic trails are built either by the State or by private parties, for both pleasure and accessibility. Trails are also used for fire lines, but due to their narrowness are not of great value for this purpose. Stock trails are built for moving stock over rough country from one range to another.

USES OF ROADS

The first roads constructed in the forest regions of the west were built for stage lines and for freighting purposes; logging had not been developed to any extent in the Rocky Mountains. At present the purposes of building roads are for (1) freighting, (2) logging, (3) stage lines, (4) pleasure, (5) fire lines. Freighting is a very impor-

tant item where camps and towns on a forest are located at a distance from the railroad. Where logging is going on in the Rocky Mountains, roads must be built on account of the extreme roughness of the country. Roads, because of their greater width, are well adapted for use as fire lines. In more level regions fire lines can be used as roads.

CONSTRUCTION OF TRAILS

Trails on the forest at present may be classified as: (1) main trails, (2) secondary trails, (3) spur trails. Main trails are those connecting ranger districts of the forest. They should be well worked, well brushed out and well blazed, and should have a fairly wide tread with a maximum grade of from ten to twelve per cent, for most of the traveling in the district will be on them. Secondary trails are those connecting the main trails. They should also be fairly well worked and blazed, and have a maximum grade of twelve to fifteen per cent. Spur trails are usually short trails connecting lookouts with the more important trails. These spur trails are used only by the fire guards and therefore it is not necessary to do a great deal of work on them. They can be blind trails and need only be brushed



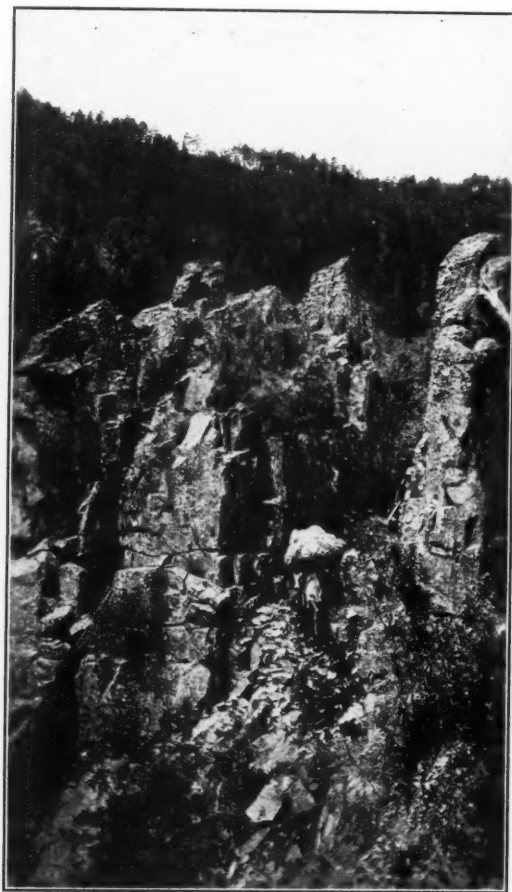
THE DECIDUOUS LEAVED FOREST IN THE BOTTOM OF A CANYON. THE LARGE TREES ARE ELM AND COTTONWOOD.

out enough so that a horse can get through with ease, which would mean a cleared space of four or five feet. A grade of fifteen to twenty per cent would be permissible.

The first and most important consideration in trail construction is always the location work. Grade is always the determining factor in location. Where it is steep, switchbacks should be resorted to. The methods used in location are, (1) compass and Abney hand level (accurate), (2) hand level only (fairly accurate) and (3) ocular leveling (inaccurate). A route should first be reconnoitered and definitely decided upon before it is staked out. The main points can be sketched in on a map by means of a compass and hand level. On short distances the hand level will be sufficient. Laying out by eye is a poor method and inaccurate at its best. The route should be staked every 50 to 100 feet and blazed, but as a usual thing routes are laid out by blazing only. The blazes should be made close together along the trail so that

there will never be any trouble in following them; a long blaze with a horizontal notch above is used on Forest Service trails. Location should always be from the top of a hill to the bottom, otherwise the maximum grade is apt to be exceeded, because in locating from the bottom there is danger of making the grade steeper than necessary. Location work can be done very well with a crew of three men and costs from \$2.00 to \$10.00 per mile.

There are several choices for trail routes, (1) valley or canyon, (2) ridge route, (3) trails crossing mountains, and (4) foothill grade. The use of one of the first two routes depends somewhat on the nature of the country. Where the canyons are extremely steep, narrow, and full of boxes or interrupted by cliffs, the ridges and sidehills can be followed without much trouble. Where sidehill routes are resorted to, the south sidehills should be used because they are passable three weeks earlier in spring and later in autumn than north hillsides. Where the country



TRAIL BUILT AROUND A CANYON BOX BY PACKERS
OF GILA RECONNAISSANCE CREW, 1911.

has been worn down, the valleys have a gentle grade and are quite wide so that they make good trail routes. Where mountains are crossed the route is usually expensive and contains steep grades. The foothill grade is undesirable because there is so much winding in and out around the heads of canyons, in order to keep an even grade, that the trail is bound to be extremely long.

In the southwest, where cattle graze on the forests to some extent, it is found that they are very good engineers in the location of trails, as a number of trails on the Gila National Forest of New Mexico are old cattle trails which have been brushed out and blazed. In

going up a grade cattle resort to switch-backs and always travel where the going is best, keeping an even grade. In traveling down a ridge or canyon they always pick out the smooth spots and many of these trails located by cattle are just as good as those located by man.

The factors which influence the building and cost of trails are: (1) grade, (2) width of cleared space and the tread, (3) nature of the soil, (4) cost of labor, (5) distance for packing supplies, (6) distance men walk to work, (7) cost of supplies, and (8) supervision. Grade, as said before, is the determining factor of location; the steeper

the grade, the greater the length of the trail and consequently the greater the cost. The greater the amount of brush, the wider the space brushed out and the wider the tread the greater the cost. The cleared space varies from 6 to 14 feet, and the tread varies from 1 to 4 feet. Ordinarily a tread of 18 inches is wide enough, for a horse will almost invariably travel on the lower side of a trail and always in the same place, so if the trail is wider than 18 inches the inside will just fill up with sliding material and the extra cost in excavation will be thrown away. On turns, trails are widened and on switch backs the width is doubled. The trail bed should be flat. Excavation should be made into the bank instead of building up the lower side of the trail, because on steep slopes earth thrown out of the trail makes a poor footing. The nature of the soil affects the cost of excavation. The cost for excavation of sand would probably be the greatest, as the greatest amount of material would have to be taken out. The bank on the upper side of an excavation should slope away

from the trail, the angle differing with the nature of the soil, as follows:

Sand, angle of repose	$23\frac{1}{2}^{\circ}$	or	43%
Earth, angle of repose	33°	or	65%
Dry clay, angle of repose	----- 45°	or	100%

The greater the cost of labor the greater the cost of the trail to a certain extent. In some cases it is cheaper to hire a good crew and pay them good wages than to hire an inefficient crew at a low wage. The greater the distance the men walk to work the greater the cost of the trail, because even when the time of going to and from work is taken outside of the regular eight-hour day, which is usually the case, a large amount of walking and climbing before and after work will tire and worry the crew so that they will not be as efficient as otherwise. The supervision of the crew is the most important factor of all because, if the work is not arranged as it should be, the trail will be expensive under the most favorable conditions.



PINE CLAD SLOPES WITH CLIFF ABOVE.



A DENSE MIXED FOREST. A ROCKY LEDGE HIGH ABOVE THE BIRCHES, ASPENS AND PINES.

The size of the crews varies from 2 to 15 men. In crews of 8 to 15 men it is necessary to have a cook, a packer, and a foreman. The brushing out can be done by 2 to 4 men while 5 to 8 can do the grading. Small crews vary from 2 to 5 men. The men do their own cooking and a ranger has general supervision over the work. The tools ordinarily used are axes and brush hooks for brushing out; cant hooks and peavies for moving logs; shovels, picks, and mattocks for grading. Where small crews are at work and the slopes are not too steep the trail is brushed and blazed, and left in that condition for travel to cut out the tread. A method similar to this was followed in connection with the Gila reconnaissance work in New Mexico in the summer of 1911. The reconnaissance party was working in a fairly open country in which there were scarcely any trails. The packers were sent ahead to locate a route to the next camp and to blaze and brush out the trail to a width of about 4 feet. Then

when the pack outfit, which consisted of about 18 burros and 2 horses, went over this route it would be fairly well cut out so that with a little extra work a good trail could be built.

On side-hill locations where water will run down a trail, it is always best to put in water bars, that is, small ditches 2 inches to 4 inches deep running diagonally across the trail and banked on the lower side with earth or a small log sunk a few inches in the ground. These will turn the water and prevent any great amount of washing, which might ruin a trail. The number of water bars will vary with the grade of the trail and the degree of slope of the side hill on which the trail is located. It is much cheaper to put them in when building the trail than afterwards. Under ordinary conditions they can be located from 50 to 75 yards apart.

In locating a trail, cliffs and rocky outcrops should be avoided because powder work is very expensive. Occasionally when a trail affords so many advantages that a high cost is permis-



PINES SLOWLY INVADING THE GRASS FORMATION AT THE HEAD OF CANYONS. THE LIGHT AREAS ARE ROCK OUTCROPS.

sible a great deal of rock work can be done. The two materials used for blasting are dynamite, which costs from 10 to 15 cents per pound, and black powder, which is about the same price. Dynamite when exploded works instantaneously with a sharp shock, while black powder works slower and exerts more of a shoving force. The cost of rock work varies from \$.50 to \$1.50 per cubic yard.

In general in building trails the country should first be reconnoitered and the route fully decided upon. The trail should then be located by stakes or blazes and the route cleared and brushed out to the specified width. The grading work should then be done and the tread

made the specified width. Signs showing the distance from important points and from water should be put in every mile if possible and never less than every 4 or 5 miles.

ROAD CONSTRUCTION.

The use of a road largely determines the amount of work which should be done upon it. Freight roads and stage roads as a rule should be well worked and kept in good condition and if there is a great amount of traffic they should be double tracked or turn-outs made along the way, while for logging purposes it is not so necessary to have a well worked road, as it is only used



THE DOGBANE, A CONSPICUOUS PIONEER AFTER FOREST FIRES IN THIS LOCALITY.

temporarily, the road being abandoned as soon as the timber is cut. The maximum grade for the former road should be 7 per cent, but for a logging road, especially where all logs are hauled down hill, the maximum grade may be greater but should rarely exceed 12 per cent, and then only for short distances. Where roads are used for fire-lines, and fire protection is more important than traffic, the only work necessary is that of clearing the space.

The location of a road is more important than that of a trail, because the former demands a gentler gradient and requires a greater amount of money in its construction. Since grade is the determining factor in locating roads a transit should be used for that purpose, because of its accuracy. Heavy rock work and the construction of bridges should be avoided on account of the great expense. Side hills are the best for location since they are driest, have the best drainage and the best surface, and require less repairs, although the grading at the beginning will probably cost more. Routes of avalanches should be avoided, also routes in deep cuts, because the latter will fill up with snow. Switch-backs should not be used, for the sharp turns are not adapted to wagon traffic. The cost of location varies from \$5 to \$50 per mile.

The factors which influence the cost of roads do not vary a great deal from those affecting trails. They are (1) grade, (2) width, (3) amount of brushing out, (4) amount of grading, (5) drainage, (6) rock work, (7) distance for hauling supplies, (8) cost of labor, and (9) supervision. The steeper the grade the greater the length of the road. As the maximum grade for most roads is from 6 to 7 per cent, a steep grade will greatly increase the length of the road. The width of the roads varies from 8 to 12 feet for single track roads and 16 to 20 feet for double track. The width of the road naturally affects the amount of brushing out. In heavily timbered localities the clearing is a very expensive item as it is difficult to remove the stumps and to roll the logs out of the way. The amount of grading is a factor which influences the cost,

depending on the steepness of the hillside and the number of stumps to be removed. A road should be so built that it is well drained; side ditches should be put in which have cross drains every 100 to 200 feet. In cheap roads the drains will not be covered, while in well-built roads, culverts or rocks or wood should be put in. Rock work cannot be avoided as readily in road as in trail construction and hence adds much to the expense. The supplies will be hauled by wagon, which costs only about one-third as much as by pack horses, hence the distance is not as important as in trail work. The cost of labor will affect road building the same as trail work. Supervision again is the most important factor of all.

In construction of roads, stumps and rocks should be removed by using powder or dynamite as it is much cheaper than by manual labor, because much time would be unnecessarily wasted in grubbing out stumps. All work possible should be done by teams, since hand grading in construction of roads is very expensive on account of the large amount of material to be removed. In building single-track roads, turn-outs should be built about 50 feet in length so that vehicles can pass each other. The length of the intervals between turn-outs would depend entirely upon the amount of travel expected on the road. In grading there should be more fills than cuts, because fills will drain better. In rock work the walls should slant away from the road so that debris will not be continually dropping down.

Drainage is an important item in road building. On level ground both sides should be ditched to a depth of about 1 foot and a width at the top from 2 to 3 feet. On hillsides the road should slope toward the hill with a ditch on the inner side. In swampy places a ditch 2 feet deep and 2 feet wide should be put on each side and a fairly high crown left in the center if possible.

A comparison of roads in general cannot be made because of the few examples and also because of the great variations in the use and construction of roads under different conditions.



A SAMPLE OF MANY COTTONWOODS SIXTEEN INCHES IN DIAMETER AND LARGER CUT BY BEAVERS.

Forest roads as a rule are single tracked and from 8 to 10 feet in width with a maximum grade of 6 to 7 per cent. The figures given by Mr. Greeley, of the United States Forest Service, for the cost of roads in District I, are from \$100.00 to \$1,000.00 per mile with an average cost of about \$500.00 per mile.

Just at present, trails are of much more importance to the United States forests than roads, because they are much cheaper and can be built in more inaccessible country. Very few roads have been built by the Forest Service, while a great many miles of trail have been constructed during the last few years. The great need of forests at present is an adequate fire protection, for which the trail will suffice, as far as the traveling over the country is

concerned. In 1910 an appropriation of \$600,000.00 was made for improvements, of which a considerable sum was used for roads and trails, as 2,225 miles of trails and 320 miles of roads were built. In 1911 this appropriation was cut down to \$275,000.00. Plans are now prepared for individual forests, which call for the building of over 30,000 miles of trail and 7,000 miles of road at an estimated cost of \$3,000,000.00. Several of the States have plans for road and trail construction, notably Wisconsin, Minnesota and a few of the eastern States. In the majority of States, however, forestry work does not include road and trail building.

*By courtesy of the Forest Club Annual, University of Nebraska.

OFF YEAR FOR APPLES

This is an off year for apples in New Jersey, according to the fruit growers and farmers. They say that the same trees that were so heavily laden with young fruit at this time last year that their boughs were bent almost to the breaking point are now almost bare of apples. There is no reason for the prospective shortage except that the blossoms failed to form this spring.

FOREST FIRES AND FORESTRY IN THE SOUTHERN STATES

By HERMAN H. CHAPMAN

THE future timber supply of the Eastern States must come from one of two sources, either from the Pacific Coast by rail or water, or from home-grown timber. Pine or softwoods will continue to occupy the relatively important place they now hold, in the demand for lumber. It cannot be expected that the far West can ever supply lumber to the East even by the Panama Canal in sufficient quantities to wholly keep pace with the demand or at prices as low as the present rates on Southern yellow pine lumber. The problem of providing large future crops of pine in the East is an urgent one, and it is already certain that before such crops could grow to commercial size, practically all of the present stand of pine, both North and South, will be exhausted. The situation in the northern States is well known—the cut in the eastern portion is now largely spruce and hardwoods, while in the Lake States, hemlock and hardwoods are being cut that were worthless as long as pine remained. In Minnesota a fifteen to twenty years cut of pine remains for some mills but the total output is rapidly shrinking.

The alarming fact here is that throughout the northern pine region forest or brush fires have practically eliminated the prospects for a second crop, and completely destroyed all young pine timber. Efforts at reforestation so far have not assumed proportions that promise a future supply of commercial proportions—in fact, planting must in most cases be resorted to and there are not funds available to plant the millions of acres of devastated lands in need of restocking.

This disastrous condition arises from two causes—the susceptibility of northern pines, especially white pine, to destruction by fire, and the enormous fire hazard resulting from logging opera-

tions. It is not too late to solve this problem in a small way, for small areas, by brush piling, planting and forest reserves, but in these Northern States the big opportunity to secure natural reproduction over wide areas is forever lost.

This is not so in the South. Here we have an area originally pine land, much greater in extent than that occupied by northern pines. The soil varies from fertile clay loam through silt to grades of fine or coarse sand, sometimes underlaid by hard clay, elsewhere apparently very deep and holding little moisture.

Over this great area the logging and manufacture of southern yellow pine is almost at its height, although already the States on the eastern seaboard have been practically cut over for virgin pine.

The future of these pine lands of the South is the most urgent problem of eastern forestry today. Shall they be opened up for settlements or retained to grow more pine timber? These lands are practically all in private hands, and largely belong to firms whose business it is to run one or more large modern saw mills, and to earn if possible a fair rate of interest on the millions of capital invested in mills, equipment, lands and timber. Once cut over, these lands are seldom regarded as having any possible value as sources of another cut of lumber. Hence they must be sold as farm lands. There are and will be for a long period millions of acres of lands of this character in every Southern State—lands which have been until recently regarded by the natives as of little agricultural value. The old settlers farm the better classes of soil lying along the bottoms of the smaller streams not overflowed. In many districts more land has been abandoned after being farmed for varying periods than is now under cultivation.



GRANITE KNOB IN THE SOUTHERN APPALACHIAN MOUNTAINS FROM WHICH THE FOREST AND LATER THE SOIL HAS BEEN LARGELY REMOVED.

It is true that these pine soils are the poorest soils of the South, and that under the old systems of farming, with cotton as the principal crop, their fertility was rapidly lost. But with the development of agricultural experiment stations in the South and the increasing use of leguminous crops, better crop rotations, and truck and fruit farming, poorer soils are being used profitably and prosperous communities are springing up here and there dependent wholly on the agricultural use of these pine lands. Thus the whole question of the future growth of timber crops on southern pine lands is challenged at the outset on apparently valid grounds, and by the overwhelming interest of practically all elements of the communities affected.

It will be difficult for a long time to strike a proper balance between agricultural use and forest use of these southern lands. But one thing is certain; every agricultural community no

matter how fertile the soil, is better off if a certain per cent of the land is growing trees. Every farm is more valuable if it possesses a woodlot, and the poorer the soil the greater the per cent of the total area which can be devoted to tree growing, to the best interests of agriculture and of the community. In the South the areas of poor land are so vast and the quality of much of it so poor that we can hardly expect that a fifth part of it will ever be used for the more intensive crops like truck and small fruits. There are great tracts in New Jersey on the sand plains which are idle today in spite of their nearness to the enormous markets of New York and Philadelphia. Settlement on these southern pine soils proceeds slowly. Foreigners do not take kindly to the presence of the negro. Southern whites do not welcome the foreigner with open arms. Northern farmers do not tend to emigrate South as they are unused to the climate and

social conditions. All signs point to an increasing settlement and expansion of agriculture, but this process will be a gradual one and not a rush for land. From these facts two conclusions must be drawn.

First, there should probably be from 25 to 60% of the land in every pine district in the South, devoted permanently to growing timber, the more the farther the land is from markets and transportation and the poorer the soil. Second, much of the land that will ultimately be used for farming will not be so used for 15 to 20 years and under proper management much valuable timber could be grown on it in that time by proper cutting of present stands.

Who should be responsible for the future of the southern timber crops? Should the State governments acquire lands for forest reserves and raise timber? Whatever the merits of this plan, it will be difficult to carry out, because of the fact that the forest on these lands is not needed for protection of mountain slopes or to prevent erosion, and the State would use the land solely to grow timber. There would be opposition to State reserves both because of the doubt about the agricultural classification of such lands, and because of the expense attached to their acquisition and management, which Southern States are poorly equipped to meet.

Small areas might be so acquired to be used as demonstration forests for the encouragement of private owners.

But the future of the pine forests of this region will lie with their present owners, the lumberman and farmer, and State legislation should be shaped with this in view, to encourage owners to grow timber by giving them proper assistance in controlling fires, and by equitable taxation of growing timber.

There is a striking difference between southern and northern pine in their resistance to fire. White pine is killed easily by fires even when mature. But the three southern pines are all remarkably fire resistant and the longleaf pine has adapted its whole structure and growth as a seedling to the primary object of surviving ground fires. Probably not a single pine in the South has ever grown to maturity without having

survived repeated fires. Conditions in these States make fires almost inevitable. In spite of the abundant rainfall, the late spring and summer months are usually dry and fires burn readily. These fires are set carelessly or purposely to improve grazing which in most sections is getting steadily poorer in the woods.

The effect of these fires upon the forest has been deplored by foresters, and the tendency seems to be to try to pass laws modeled after those of Northern States, which seek to absolutely prevent fire in the forests and establish a system of fire wardens for this purpose. But it is more than probable that such a policy in the South would defeat its own ends and should never be attempted. It is the right policy for Northern States, where fires can and should be absolutely prevented. But there is abundant evidence that the attempt to keep fire entirely out of southern pine lands might finally result in complete destruction of the forests.

On longleaf soils, the pine needleless form a very inflammable layer, which is supplemented by the growth of grass in open stands. In many districts, fire runs over these lands every year. In two or three years' time, if no fire occurs, there will be enough of an accumulation to make a very hot blaze, fatal to young seedlings in most cases. The risk gets worse as the period extends till at the end of ten to fifteen years, if fire is set in a dry time, the mature longleaf timber may be killed. This has actually occurred, though it is so seldom that fires have been kept out of such lands for more than a year or two, that such destruction is very rare.

In Shortleaf pine forests, fire is much less of a problem. The needles are small and accumulate slowly. There is more shade, less grass, and plenty of hardwood growth whose leaves do not burn with the heat and flame which distinguishes a grass or pine needle fire. Evidence from stumps of trees which have been burned into shows that fires occur in shortleaf at intervals of five to eight years, instead of every year or two, as in longleaf. Shortleaf seedlings are very easily destroyed by fire. But



DOE RIVER GORGE, TENN. THE FORESTS ON THE STEEP SLOPES OF THIS BEAUTIFUL GORGE HAVE ALMOST ALL BEEN CUT DOWN.

the young tree soon develops a thick bark and will resist small ground fires. In a region studied this spring in Southern Arkansas it was found that it took the average seedling only five years to reach a diameter of over an inch, and become fairly fire resistant, when growing in open places. Seedlings growing in the forest under partial shade grow more slowly and may be killed by fire at 8 or 10 years of age.

But the young trees which spring up on cut over areas would have plenty of sun and room and five years would

be enough to bring them to a fire resistant size.

On longleaf lands, the fires are at present so frequent that seedlings do not have time to get by the first two years when they are small and ill protected. If it were possible to keep fires out of an area for five years, these longleaf seedlings while still very short, —probably not over a foot high—would be an inch or more thick. None but a hot fire in dry weather could possibly kill them all at this stage. This frequency of fires is not a natural condi-



OLD VIRGIN FOREST REPLACING ITSELF WHERE FIRES HAVE BEEN ABSENT.



SKIDDING LONG LEAF PINE LOGS IN A LOUISIANA LUMBER CAMP.

tion. Fires in the past, while evidently recurring every few years, did not necessarily burn every year. The conclusions are, that both longleaf and shortleaf pine forests are capable of resisting small fires with little injury, but are destroyed by large fires at long intervals; that every acre of pine timber in the South has grown to maturity in spite of fire and accompanied by fire; and that the proper use of fire and not complete fire prevention is the only solution of the problem of future forestry in the South.

Even the seedbed of these species is soil which has been bared of vegetable accumulations, chiefly by fire; and seedlings do not start on litter or pine needles.

But between proper use of fire and promiscuous burning there is all the difference between success and failure. A lumber company, conducting a logging operation, may desire to return for a second cut over the same lands before retiring from the business. In this case, in either longleaf or shortleaf pine, the most intelligent plan is to leave the small fast growing trees, not on a diameter limit, but by selection and marking. Two things may then be accomplished—the remaining stand can be protected from fire injury and cut with profit in 20 years, and a crop of seedling pine may be secured on the ground that will be well along towards making lumber and will have a prospective value by the time the older trees are cut. The great risk to the trees left standing comes immediately after logging, when they may blow down, or be destroyed by fire when the tops are burned. The wind danger is overcome by selecting windfirm trees to leave. These can be distinguished with a little training. The fire danger is lessened by burning the ground *before* logging. But the tops constitute a great menace. The Forest Service has these tops *piled* and burned in piles, but this method is impossible as a commercial proposition, and it is not necessary in the Southeast. Only the needles and small branches burn with any flame and heat. Piling may be dispensed with and the tops burned as they lie.

But if the young trees are not to be

killed, these tops must not lie too close to them. Either by felling the trees away from small timber, lopping down limbs too near to small trees, or pulling tops away from such trees, the operator must see that about 10 feet is comparatively clear around the small tree. Then in burning, the fire must never be set in very hot weather, in high winds, or at any time when it will run rapidly, but the burning should be done as soon as possible after logging, in wet weather or when the tops are just dry enough to burn slowly and without any cyclonic demonstrations. In some regions the policy of not burning the tops at all is advocated,—but the plan outlined above is believed to be better, provided the proper efforts are made to protect the young growth.

Once this fire risk is eliminated, these young trees are practically safe from small fires. They will produce seed abundantly, and a so-called third crop of seedlings will be almost sure to spring up on the land so well prepared as a seedbed by the logging and burning.

If this seedling crop is considered of no value, the owner would henceforth neglect fires, and even encourage them. But if the land is to be kept as pine land, the future forest after 20 years depends on these seedlings. Fires must be kept out of such areas for 6 to 8 years, if possible, with a minimum of five years. This means the establishment of definite protected areas closed to fire, with proper precautions along railroads, the co-operation of settlers, and a fire patrol and means for fighting fires starting of entering the closed areas. After the expiration of this period comes the most critical time of all,—for then fire must be introduced into this young stand, and the ground burned over to get rid of the fire trap formed by the accumulated litter. This can be done at the proper season and in proper weather. Even if half the young pines are killed they will be the weaker ones and the stand is apt to be benefited as much as injured by the thinning. Fire scars at the base of small trees rapidly heal over. After this, fires can be set at proper intervals and in this way the forest will be protected and with practically no injury.

The fire scars which in time burn out and destroy old longleaf pine have usually been formed by fires burning in a dry season and in several years accumulated litter.

In the light of these facts it would be very questionable policy for Southern States by legislation to prohibit the burning of woods or attempt to prevent the use of fire. It would be far wiser for those States to establish State forestry departments with a technically trained man in charge, who can devote his entire time to educating and encouraging land owners to practise forestry by keeping their natural forest land in timber. An owner who desires to establish a protected area of the

kind above described should receive the support of the State in his efforts to keep out fire and protect reproduction of pine, which under proper conditions he is almost certain to get. But a promiscuous enforcement of forest fire laws, borrowed whole from Northern States, and utterly unsuited to the South, will never result in anything but dissatisfaction and contempt on the part of practical men for forestry. A study of actual conditions and laws designed to meet these conditions is the only route by which the South will ever improve her wonderful opportunity to preserve her lumber industry for future generations.

ECONOMIC MATERIALS FOR BOAT AND BARGE CONSTRUCTION

BY A. E. HAGEBOECK, *In charge of Cresoting Operations U. S. Engineer's Office, Rock Island, Ill.*

OUR office has been collecting data on the cost of repairs of our standard barge, 100 ft. x 20 ft. x 4 ft. 7 in., for the past 20 years. As we are building the same size barge today, the cost of repairs will be directly comparable.

It has been found practical to frame and creosote the timbers in transit at a commercial treating plant, and then forward the timbers to the point of erection. By marking the pieces that cannot be easily identified, it is possible to assemble the barge quite rapidly.

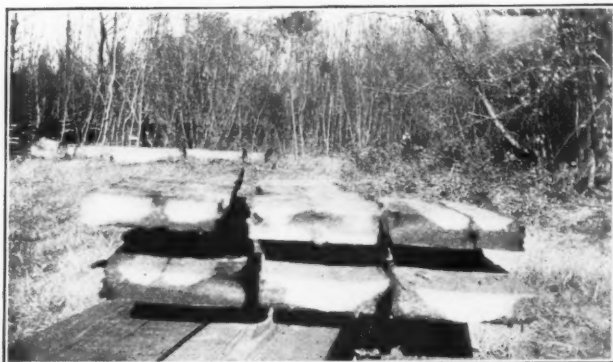
In the past five years I have examined a large number of untreated barges at various points on the river that have been in service from four to fifteen years. From these observations I would say that the decay always starts where there is an excess of moisture, together with the air and heat. In 90 per cent of the cases the decay starts in the ends of the timbers. That is to say, the decay develops in the same ratio as the wood absorbs moisture through the

ends. As a good pressure treatment will always plug the ends of the timbers, it is easy to understand why such good results have been obtained in the past with a pressure treatment of coal-tar creosote oil.

In former years the opinion was held that it would not pay to creosote a barge because it would wear out before it decayed. This may be true under certain conditions, but as a general proposition I have found the lumber decays first, and when in this decayed condition is easily broken.

For barges used in fresh water it is not considered necessary to creosote the bottom, as it has been found that the bottom plank rarely decays. This fact can probably be attributed to the exclusion of air, as a barge usually contains 4 to 6 inches of water on the inside.

In constructing light draft barges it has been our policy to use the pressure creosoted fir, as fir can be obtained in long lengths at a reasonable cost. Long timbers are especially desirable in barge



DECK PLAN REPLACED BECAUSE OF DECAY.

construction, as they reduce the number of gunwale joints to a minimum. The gunwale joints are always the first points to cause trouble by leaking, and so it is a big item to reduce these joints to a minimum. Besides being cheaper in cost, both before and after creosoting, the fir is lighter, resulting in a draft of but 9 inches for a standard barge 100 ft. x 20 ft. x 4 ft. 7 in.

White oak has been used almost exclusively in the past for the construction of model-shape steamboat hulls. The present tendency is to use steel. Creosoted timber is eliminated from consideration for model-type hulls on account of the necessity of framing and cutting timbers during erection, which would expose untreated surfaces if creosoted timbers were used. It is the opinion of the writer that the steel hull will give more economical results, for the reason that when the cost of repairs on an untreated oak hull during its life are added to the original cost, the yearly charge will closely approximate that of a steel hull.

These relations, however, do not exist in the case of "scow" pattern boats and barges. A steel barge will cost more than three times as much as an untreated fir barge, and nearly three times as much as a creosoted barge. The lumber for these "scow" pattern boats and barges can be advantageously framed and bored before treatment.

The first creosoted barges used in this country were built in 1900 of pressure treated yellow pine by the New Orleans Office of the U. S. Engineer Corps.

These barges are today in a perfect state of preservation, and in all probability will be used for 10 to 12 years longer. The cost of repairs has been light, and the results so satisfactory that no untreated barges are now built by that office.

The Rock Island District formerly used the open-tank treatment. The penetration was usually superficial, but the cost is only 5 per cent of the total cost of a fir barge. Last fall the writer inspected a large number of these fir barges built in 1908, and in no case was any evidence of decay found on the treated timbers, while in a number of cases the untreated timbers had reached an advanced stage of decay. It is, therefore, evident that the small cost of this treatment will pay good returns on the money invested. In the case of 90 per cent heart Long Leaf Pine the same conditions exist, as the penetration on the heart surfaces is usually superficial. With the Short Leaf and Loblolly Pine it has been our experience that this class of timber requires so much oil to saturate the sap that it often costs more than a 10-pound pressure treatment. For treating barge timbers the pressure treatment has, in the opinion of the writer, a number of advantages that make it a far more economical treatment. First, from a treating standpoint, it is possible to treat either green or seasoned lumber. Second, the exact quantity of oil injected can be ascertained by the temperature and gauge readings. Third, the entire treatment can be regulated

to meet the requirements of each particular charge. Fourth, it is possible to plug the ends of the timbers and thereby retard the absorption of moisture. Fifth, the penetration of oil is far more uniform. The last two factors tend to eliminate the so-called "working" of the timbers. This is an important item in barge construction, as it is a well-known fact that a barge built of green untreated lumber will usually cause trouble from leaking, due to the subsequent shrinkage of the timber as it dries, and the consequent opening of the seams and loosening of the oakum. Even after the lumber has once become dry it readily absorbs moisture during a wet period and again gives it up during a dry period, and as a result an untreated barge is re-calked every year after its fourth or fifth year in service. The pressure treatment has largely eliminated this re-calking, and so materially reduced the cost of repairs.

In conclusion I will state that the original cost of a steel barge with interest on the investment is not compensated for, by the added life, compared with a creosoted barge. That the cost of repairs on an untreated barge and its short life of real hard service makes the annual cost, including interest, 25 per cent more than for the pressure creosoted barge. That the pressure creosoted yellow pine barge and the pressure creosoted Douglas fir barge have respective fields depending upon the working conditions; on the Lower Mississippi, where there is always a good stage of water, the creosoted yellow pine will probably be more desirable, but for light draft and use on the upper Mississippi the pressure creosoted fir will be far more economical.

*By courtesy of the American Wood Preservers Association.



UNTREATED DOUGLAS FIR HULL FOUR YEARS OLD.

PLANTING NEW PINE TREES

Superintendent Eldridge, of the western division of the Florida Forest Reserve, is showing great activity and is securing good results. He will plant this season 800 pounds of Maritime pine seeds, a French species of the pine which the government thinks will serve as well for naval stores purposes as the Southern pitch pine. The start with this pine was made last year by planting 500 pounds of seed.

FIRE PROTECTION ON THE OZARK NATIONAL FOREST

BY FRANCIS KIEFER

Supervisor, Ozark National Forest, Arkansas

THE point in fire protection upon which the American forester lays greatest stress is the quick extinguishment of small fires and the consequent prevention of larger ones. In Arkansas, peculiar features in connection with topography, climate, vegetation, and local sentiment (more particularly the last) have increased the usual difficulties of fire protection, and, on the Ozark National Forest, have resulted in a unique solution of the problem.

Briefly, conditions in and near the Ozark National Forest are these: From central masses which divide the headwaters of the streams flowing north and east into the White River and those flowing south and west into the Arkansas, broken, round-topped hills radiate irregularly in all directions. Their altitude rarely exceeds 2,300 feet above the sea, or 1,800 feet above the lowest valleys.

Although the rock and boulder-strewn mountain sides are frequently broken by abrupt limestone cliffs, narrow benches occasionally attract the local farmer. On the rolling crests of the ridges, wherever the thin soil is at all productive, are scattered cornfields. In the narrow creek valleys the ribbons of alluvial fields stretch unbroken.

The Forest embraces many hardwoods of which white oak is the most prominent. Shortleaf pine is sprinkled on the south slopes, and is gradually strengthening its foothold. Trees of all ages and kinds grow in mixture—black oak, blackjack oak, post oak, black hickory, and pale leaf hickory, confining themselves to the drier, less fertile hilltops; white oak, red oak, shag bark and pig nut hickory, seeking the moister, deeper soils of the north and lower slopes. Groups of red cedar grow

on the bare, shallow limestone slopes and ledges. Reproduction of all these species is dense and thrifty wherever fires have been excluded. Sprouts, of course, are abundant, because fire, which is conducive to sprout growth, has been nearly everywhere.

The ground cover consists of sedge grass, lespedeza, and other range plants. Where fire is kept out for a year or two all of these are quickly smothered by the heavy floor of coarse oak leaves. Often burned areas support a sparse growth of sedge grass, wild pea vine, lespedeza, and other herb weeds less valuable for forage, upon which the scattered cattle of the mountaineers depend for subsistence.

Every year the woods are burned over to improve the range. The people pattern the often described mountaineer of Kentucky and Tennessee. They lead a secluded existence in their valley and ridge-topped communities, depending upon the forest range and mast for fodder for their cattle and hogs. Undisturbed, they have for years burned over the woods and destroyed the underbrush and litter of hardwood leaves in order to encourage the growth of grass and herbs. It is this custom, firmly established, which has been the greatest obstacle in the way of efficient fire protection in Arkansas. Observations made on the Arkansas and Ozark Forests show that burning in the long run does not benefit the range, which at best is inferior, but that on the other hand tremendous injury results to tree growth through the total destruction of reproduction and basal scarring of the older timber.

With this fact established a vigorous educational campaign was undertaken against woods burning, which has been continued to the present time. The re-



SHOWS LOOKOUT TOWER ON MCGOWAN'S POINT. THESE PICTURES SHOW THE NEED OF A HIGH TOWER ON THE OZARK NATIONAL FOREST, BECAUSE OF THE HIGH TREES SURROUNDING. THESE TREES THAT ARE NEAR WILL BE FELLED TO PREVENT DAMAGE BY REASON OF THEIR FALLING AGAINST IT IN A HEAVY WIND STORM. MCGOWAN'S POINT, ARKANSAS.

sults, though slow, have been encouraging.

The system of fire protection first adopted was a riding patrol maintained during the fire season in the spring and fall. On the Ozark each of the six district rangers, with 160,000 acres to cover, was authorized to expend from \$150 to \$200 for the hire of mounted patrolmen as conditions might demand. The first year the mere presence of the Forest officers checked wholesale burning. By the second year, however, this influence waned, and burning was

carried on more vigorously than ever. The season (fall of 1909 and spring of 1910) was unusually dry and windy, and the Forest officers were unable to cope with the situation. But the very extent of the damage which resulted worked in favor of the Forest Service, for many of the settlers who suffered heavy fire losses in fences and buildings became strong supporters of an effective plan of fire control. At the same time the inefficiency of the riding patrol and fire-fighting methods was made clearly apparent. Their weakness

lay in the fact that persons who wished to burn the woods could watch the movements of the patrolmen and set fires during their absence. Thus several fires could be started and given the opportunity to spread past control before the patrolmen returned. This fully demonstrated the need for permanent lookout points from which fires could be accurately located immediately upon their appearance. The patrolmen, it is true, maintained an intermittent lookout in riding point to point, where tall trees had been trimmed and made climbable by the insertion of telephone pole steps, but this was insufficient.

At this point, Mr. Adams, then Supervisor of the Arkansas National Forest, introduced his ingenious ideas in watch towers and fire-fighting apparatus. His success encouraged the adoption of a scheme of steel lookout towers. The system installed on the Ozark during the fall of 1911 includes seven 64-foot towers and 120 miles of telephone line. The towers, with square open platform, are placed upon the highest points of vantage with least obstructed view. Each tower is connected with the others by telephone, and is equipped with a special telephone instrument and dial range finder. The range finder, a German silver plate 1-16 of an inch thick and 10 inches square, inscribed with a compass circle, is securely mounted on the apex of the four posts of the tower in the center of the platform, at a convenient height for the observer. In the center of the circle, swung on a pivot, is an arrow with sights. When the lookout discovers a smoke, he trains the sights on the fire and reads the bearing indicated by the arrow point. He then communicates by telephone with a neighboring tower and secures a cross bearing. With two bearings he is able to notify the district ranger of the exact position of the fire with reference to legal subdivision, topography, roads, etc. In this he is aided by the title map and protraction chart showing each tower with bearings projected for every five degrees. As a check the lookout makes a detailed report of his finding and action, and at stated intervals during the day reports by telephone to ranger headquarters.

The approximate average cost of a tower on the Ozark Forest is as follows:

Cost of tower f. o. b. factory-----	\$63.00
Telephone instrument-----	24.00
Range finder-----	8.00
Tools, dynamite, and miscellaneous--	5.00
Freight and hauling-----	25.00
Labor -----	25.00
Total -----	\$150.00

Description of tower:

Weight-----	1,440 pounds
Height-----	64 feet
Platform-----	5'x5'
Capacity-----	5 persons
Safe load-----	16,000 pounds
Depth of anchor plates-----	5 feet
Spread between posts at ground-----	12 feet

As soon as a fire is reported by a lookout the district ranger takes steps to extinguish it. Each ranger district is subdivided, as streams and roads dictate, into fire-fighting units, in each of which a reliable settler is designated as "selected fire-fighter" and supplied with complete fire-fighting equipment, consisting of potato rakes, wooden brooms, canvas sprinkling buckets, and pack bags. He has also a title and topographic map of his unit which enables him quickly and intelligently to plan his action. As a rule each "selected fire-fighter" is connected indirectly to the ranger station and lookout tower by a neighborhood telephone line. When a line of communication is lacking the "selected fire-fighter" is reached by a mounted messenger.

As soon as a fire is reported to a ranger he notifies the proper "selected fire-fighter" to hasten immediately to the blaze with such tools and extra help as he may need. Should the ranger in the course of his duties be out of touch with the lookout tower, the man in charge of the tower directs the "selected fire-fighter."

This simple organization has worked successfully wherever reliable men to serve as fire-fighters can be found and a good telephone line exists. Fires are discovered in their beginning and extinguished while they are still small. The value of a tower itself lies in the fact that it gives a stable and protected support to the range finder and elevates the lookout above the surrounding brush and timber.



GOV. BASS AND DIRECTORS OF AMERICAN FORESTRY ASSOCIATION ARRIVING AT LOST RIVER CABIN



DIRECTORS OF THE AMERICAN FORESTRY ASSOCIATION ALONG THE COURSE OF THE PICTURESQUE LOST RIVER.

IN THE WHITE MOUNTAINS

ONE of the most important actions taken by the directors of the American Forestry Association, who held their midsummer quarterly meeting in the White Mountains on July 17, 18 and 19, was the passage of a resolution protesting vigorously against the proposed amendment to the Agricultural Appropriation Bill, soon to be acted upon by the Senate, which provides that all lands in the national forests, "suitable and fit" for agriculture, must be classified and listed for settlement whether it is wise or unwise to remove them from public control. This resolution has been sent to each member of the Senate with a request for his careful attention.

The directors, with a number of guests, including State foresters, forestry instructors, State officials, timberland owners, paper and pulp company officials and a number of other prominent men, gathered at Plymouth, N. H., on the morning of July 17 and, through arrangements by Col. W. R. Brown, of the Berlin Mills Company, journeyed to North Woodstock in automobiles. The afternoon was spent in looking over the Lost River reserve, recently acquired by the Society for the Protection of New Hampshire Forests, and the members of the party climbed down the course of the Lost River for some distance among the mammoth boulders, into the caves they form, and viewed the remarkable scenic effects caused by some remote convulsion of nature, with wonder and delight. Here is a spot, which, when the road to it is improved, will become the mecca of almost every sight-seeing party going into the White Mountains.

There followed in the evening, at the Deer Park Hotel, a meeting participated in by the directors of the Association, and under the auspices of the Society for the Protection of the New Hampshire Forests. Some three hundred deeply interested people attended, many of them of national prominence.

They included Mrs. Grover Cleveland, Governor Robert P. Bass of New Hampshire, the president of the American Forestry Association, who opened the meeting with words of welcome; former Governor F. W. Rollins, who presided; former Governor Quimby of New Hampshire, former Governor Woodruff of Connecticut; President John H. Finley of the College of the City of New York; President Henry S. Drinker of Lehigh University, and—as ex-Governor Rollins said—"so many distinguished people that you could not turn around without bumping into one of them."

W. R. Brown, president of the New Hampshire Forestry Commission, told about the progress of forestry in New Hampshire during the year, his address appearing on another page; a paper by Montgomery Rollins, on the acquisition of Lost River, was read; E. E. Woodbury, an orator of North Woodstock, told of the towns interested in the Lost River, and there were talks by Dr. Finley, ex-Governors Quimby and Woodruff, Dr. Drinker, Dr. B. E. Fernow of Toronto, P. S. Ridsdale, executive secretary of the American Forestry Association, and others.

The following day the entire party journeyed by automobile to Bretton Woods where Thursday and Friday were spent in viewing the Crawford Notch reserves, and at several important meetings discussing forest problems and conditions of the day. The directors of the American Forestry Association held their sessions at the Mt. Washington Hotel and the other meetings were at the Mount Pleasant and the Crawford House.

Reports of the condition of the Association were most satisfactory and showed that the membership is steadily growing, that the sphere of its influence is rapidly extending, and that it is now regarded as one of the most important organizations, for the good of the general public, in the country, and as such

is receiving steadily increasing support and recognition.

At the fifth annual forestry conference meeting on the afternoon of July 18 there were represented the American Forestry Association, the Society for the Protection of New Hampshire Forests, the New Hampshire Timberland Owners' Association, and the Association of North Eastern Foresters. The fire protection problem was discussed at length, papers being read by Prof. J. H. Foster, of the New Hampshire State College; E. A. Ryder, Commissioner of the Department of Claims, Boston and Maine R. R.; State Forester E. C. Hirst, of New Hampshire; F. H. Billard, forester of the New Hampshire Timber Land Owners' Association; F. G. Olmstead, consulting forester of Boston; F. W. Rane, state forester of Massachusetts; S. N. Spring, state forester of Connecticut; Austin F. Hawes, state forester of Vermont, and Dr. B. E. Fernow, of Toronto.

In the evening H. S. Bristol, superintendent of Woodlands, for the Delaware and Hudson R. R. Co., spoke on problems of forestry as they relate to the railway; Prof. Walter Mulford, of Cornell, discussed the prospects of forestry as a profession; Prof. W. C. O'Kane, of the New Hampshire State College, spoke on the present status and prospects of the gypsy moth and the brown tail moth in the State; George H. Wirt, chief forest inspector of Pennsylvania, gave an illustrated lecture

on the management of State forests in Pennsylvania.

At the annual meeting of the Society for the Protection of New Hampshire Forests, held on the morning of July 19, reports were made on the gratifying progress of the society's work in the past year. In addition, Herbert Welsh, of Philadelphia, spoke about the progress upon the Sunapee Forest Reservation, and Harris A. Reynolds, Secretary of the Massachusetts Forestry Association, told how he is organizing branch associations in that State.

The ever interesting and vital question of the taxation of forests was discussed at the concluding meeting of the conference on Friday afternoon. Dr. B. E. Fernow spoke on the principles underlying the taxation of forests; Prof. F. R. Fairchild, of Yale, discussed the taxation of forests in America and abroad; and Prof. Charles J. Bullock, of Harvard, gave his ideas on practical plans for taxation in New Hampshire and Massachusetts. The other foresters and lumbermen present joined in the discussion, which, while it resulted in the enlightenment and instruction as to ways and means, of all who were present, did not reach any definite conclusion as to the best way to overcome existing difficulties.

In the evening, at the Crawford House, Philip W. Ayres, forester of the Society for the Protection of New Hampshire Forests, gave an illustrated address on the forests of the White Mountains.

MORE LAND FOR RESERVE

Washington, D. C.—The National Forest Reservation Commission has approved for purchase 55,000 acres in the Smoky Mountains of Tennessee and North Carolina. In addition, a tract of 24,900 acres, near the Natural Bridge, in Virginia, was approved for purchase. It is estimated that nearly \$2,000,000 was expended in connection with the acquisition of lands under the provisions of the Weeks law during the fiscal year which ended June 30, 1912.

OUR NATIONAL TIMBERLANDS THREATENED

By HERMAN H. CHAPMAN

LEGISLATION pending in the present Congress, and which may be consummated at any day, threatens to take from the National Forests of the West, millions of acres of the most valuable timberland remaining in government control, and turn it over to the large lumber companies through the agency of the homestead laws.

In the agricultural appropriation act, which is now in final conference, the clause was introduced by Senator Nelson, providing that all lands "suitable and fit" for agriculture must be classified and listed for settlement at once under the homestead laws. This clause is intended by its author to apply to heavy bodies of timber. Under its operation all timber on the National Forest, which is growing on land for which any claim of agricultural value can be made must be listed, not when there is need of it for farming, but now, and by this listing be removed at once from the jurisdiction of Forest Service. Not a single safeguard is thrown around the operation of such a clause, and it would become necessary to list all lands of doubtful agricultural value, which might be claimed or desired for their timber under the guise of agricultural use. Claims are made that even steep mountain slopes are suitable for fruits and orchards and this would mean the immediate elimination of timber-covered slopes, because some of this land might some day be used for such purposes, and it is, therefore, all suitable and fit for agriculture.

There is hardly an acre of good timber land in the West to which claim would not be made under this proposed law, and if pushed to its logical conclusion the nation would be stripped of its remaining timber resources for the ultimate enrichment of the large lumber men, and an incidental and temporary benefit to those through whose

hands the timber passed en route to its ultimate ownership.

The opposition of the friends of true conservation secured a change in the wording of this amendment, while it was in the hands of the Conference Committee, and it now reads that all lands that are "chiefly valuable for agricultural purposes and that are not needed for public purposes, or for use by the public," must be listed immediately. This would prevent the listing of timbered land, and would prevent applications for water-power sites and for government ranger stations, which, under the original clause, could have been demanded as agricultural lands. The adoption of this modified amendment has met with bitter opposition on the floor of the Senate and the advocates of the original timber grabbing amendment threatened to filibuster against the bill and prevent the passage of the appropriations for the Forest Service unless they are permitted to have their way.

When these forests were created they were supposed to include lands more valuable for their timber or for the protection of water sheds than for agriculture, and to exclude lands chiefly valuable for agriculture. It was impossible to avoid including some lands within the original boundaries, which were agricultural in character, but as fast as the work could be done close examinations were made of all forests and the boundaries were readjusted to exclude all large bodies of lands, not heavily covered with valuable timber, which could be used for agriculture. This work has been completed for over a year, but to supplement this classification and make sure that there remain no land genuinely desired and suitable for farming, a law was passed June 11, 1906, permitting persons to apply for any lands within the National Forests for homesteads. If, on examina-

tion by the Forest Officers, these lands prove to be agricultural and not more valuable for their timber than for farming, they were listed for settlement. In this way practically all lands of enough possible agricultural value to induce some one to apply for them, have been or will be listed and eliminated from the forests, except those lands which are covered by heavy stands of timber on a soil which would be agricultural, if cleared. The liberality of the Forest Service in listing lands has gone even beyond the points of the limits of wisdom, for in some cases on National Forests, from twenty to forty per cent of the lands listed on application of would-be homesteaders are not even filed upon, but remain vacant, and the number of claims which are proved up will fall far short of those listed.

There remains the heavily timbered lands with good soil. Under the operations of the old land laws, all such lands were eagerly sought by claimants who proved upon them as homesteads or secured them under the Stone and Timber acts. Few of these claimants had the slightest intentions of retaining these lands for homes and they sold them to lumber companies at low prices as soon as they obtained title. In this way the large holding of the Western Lumber men were built up.

To prevent a repetition of this process to secure the true aims of the law and encourage bona fide settlers and not timber land grabbers, the Forest Service has been obliged to report adversely on hundreds of applications for timber lands under the homestead provisions

under the act of June 11, 1906. On the other hand the service attempts to encourage the sale of timber from these lands as rapidly as possible. When the timber is sold and cut the lands are listed for settlement and none but the genuine homesteaders ever apply.

If such lands should fall into the hands of lumber companies who already own vast areas, the chances are that they will not be logged for many years. After removing the timber the companies will endeavor to sell these lands to settlers who will thus be under the handicap of paying for the land as well as clearing it for farming. The policy of the service tends to concentrate lumbering and sales on agricultural lands and is the surest method of hastening the settlement of such lands. It is evident that under the present law agricultural development is stimulated and not delayed.

The situation calls for immediate action on the part of those who desire the true development of the West and are opposed to the old wasteful policy of the past. The specious arguments which are cited to justify this timber grab break down in the light of those facts. If the nation is to have timber in the future, it must come largely from lands owned by the Nation and the people. If inroads upon these timber lands are allowed to go on unchecked in the interest of private greed, it will not be a decade before the National Forests will be reduced to barren rocks and snowy mountain tops, which now compose more than half their total area.

SHOOTING IN BURMA*

By A. J. BUTTERWICK, *E. A. C. Forests*

IN the beginning of this year I was instructed to go and do markings in the Mahuya and Paunglin Reserves, which lie on the eastern slopes of the Pegu Yomas, and in which the two chaungs, the Paunglin and Mahuya, take their rise, and uniting, eventually form what is commonly known in Burma as the Pazundaung creek. When I arrived at my destination, the villagers round

about came and gave me thrilling accounts of the many tigers and elephants which roamed about the surrounding forests. As the latter class of animals may not be shot except under certain conditions, and as I had never shot a tiger and was very anxious to do so, I gave all my spare attention to the former class. I tried again and again to purchase a buffalo or cow-calf to put

out as a bait, but the villagers refused to sell me even one. I was thus forced to rely on the chance of finding a kill of a wild animal in the forests. I was rather lucky in this, as about three weeks after I had arrived, one of my men one morning came upon the body of a sambur stag which had been killed by a tiger on the previous day. In the course of the day I had my *machān* erected on a conveniently situated tree and at about 4.30 P. M. I started off the kill, accompanied by two Burmans. When I arrived there, to my great surprise I came face to face with the tiger having its meal. However, before I could get a shot stripes was off. I felt inclined to return to my camp, thinking that the beast would not come back that evening, but acting on the advice of my Burmans, I changed my mind and went to the *machān* followed by my men. We had hardly been seated for half an hour, when I saw the huge cat coming stealthily along towards the kill, taking cover most carefully for about four or five seconds behind every bush it came across. As it approached nearer and nearer to the kill, I gradually brought my rifle up to the present, and as soon as it came into the open near the carcass, I aimed for its heart and fired. As soon as I had done so, the beast gave a wild jump, let out a loud roar and rolled over. At first I thought it was dead, but after a short time it got up and disappeared from sight into the thick undergrowth. As it was getting dark by then I decided not to follow up the wounded animal, but returned to camp as soon as possible. The next morning, accompanied by almost all the villagers who having heard of the affair had early flocked to my tent, I went in search of the tiger. When we came to the site to my great astonishment I found that the kill had been dragged during the night. This could mean either I had not mortally wounded the tiger or else there was another animal feeding on the kill. The first supposition was soon dispelled, for we soon after struck the trail of blood and found stripes lying cold and stiff in a chaung close by. It was a tigress I had shot, and it measured 8 feet 6 inches. The bullet had gone clean through its body, and it must have died shortly after we

had quitted the *machān* the evening before. The Burmans and Karens then told me that its pair must be the animal which had dragged the kill during the night. I immediately had another *machān* erected and went off to work. I went out to the kill that evening at about 3.30 P. M., but when I arrived there I found that the body had been dragged again by the beast during the day. To enable me to see the carcass clearly from the *machān*, I had the place around it slightly cleared, but whether this cutting frightened the animal or not, nothing turned up that evening, although I sat up till it was too dark to see. The tiger, or whatever it was, came, however, the same night and dragged away the kill again. I had another *machān* erected near the new spot and sat up again that evening. When it was almost dusk, to my great surprise, instead of a tiger a huge black bear shamled out from the undergrowth and started eating at the carcass. I soon settled him with a shot through his breast. I then naturally concluded, that it must have been the bear that had dragged the body of the deer the day before. But the Burmans and Karens would have it that it was a tiger and even showed me fresh pug marks of the huge cat. They also solemnly stated that the tiger had not come because it was afraid of the bear, and that it would come again now that the latter was dead. I may here state that when I was skinning this animal the villagers were very keen on getting hold of a part of the intestine they called the *the-gay*. I do not know exactly what organ of the bear's body it is, but it was considered very valuable as a medicine by the people, and one villager even offered me Rs. 5 for it. He was greatly surprised when I declined to sell it to him, but gave it away *gratis* to the man who had helped me most in the shoot. Well, to revert again to the kill, I found the next morning that it had been dragged yet again, and I was thoroughly astonished. In the evening I sat up again on a newly-made *machān*, but it was in vain, as nothing appeared. The next evening, however, I was more fortunate, but again, instead of the expected tiger, another black bear came to the kill, and I easily disposed of him.

*Courtesy The Indian Forester.

NEW HAMPSHIRE STATE WORK*

By W. R. BROWN

IT is a great privilege and pleasure for the State of New Hampshire to receive a visit from the Directors of the American Forestry Association and to extend to you and your guests, not the keys of the City in this case, but the open door of this, our beautiful State. We are particularly glad to welcome you, and it is especially appropriate that you come to us just at this time, to help us take stock of our recently acquired land reservations; and while we felicitate ourselves on the happy termination of the event, we are not unmindful that a large share of our thanks is due to you for the aid and assistance which you have so generously given us, in our endeavor to have these Federal, State and private reservations established among the White Mountains.

While earnest endeavors towards conservation are being here crystallized into a tangible fact; while this land is about to be purchased and administered, I must not fail to bring to your attention also the considerable responsibilities which it involves, and that the administration of this property wisely, will have a great effect upon the common acceptance which is given to the practice of forestry. Both the immediate and potential good to be derived must be clearly shown, for it must not be forgotten that the State is losing a considerable income from taxation in the passing over of these lands.

I have been asked to give a short account of State work and will therefore take up the administration of State land first. For the first time in this country the usefulness of preserving timber for the protection of stream flow has been actually demonstrated by the Geological Department, and the maintenance of a thick cover upon the headquarters of the streams should be aimed for. This

will probably necessitate a certain amount of planting on the waste and cut-over areas, and the conservative cutting of the tracts containing mature trees. It will also carry with it eternal vigilance against the spread of any fire, and call for careful observation and supervision of the general public, who will make use of it in the way of a public park. As much income as is compatible with the essential preservation of stream flow and park purposes, should be derived from the cutting of the mature trees in order to help pay the necessary expense of supervision and restocking. It is extremely doubtful if there will be anything but a debit balance for the first few years in the administration of the present State lands, but it is not unreasonable to prophecy that in the case of the Federal Reserves in the end, they will prove extremely valuable to the Government and yield a handsome income over and above the cost of maintenance. Particularly will New England profit by the demonstration which can there be made of silvicultural practice of efficient methods of protection against fire. And to the Forest Service also the practical operation of logging methods designed to suit New England conditions will be of high educational value.

The reservations which have been taken over are as follows: Two belonging to the Association for the Protection of New Hampshire Forests, one of which is the Lost River Reservation, which you have seen, comprising 148 acres, and which it is proposed to maintain as a public park. This reservation was secured through a widespread subscription. The other one, the Sunapee Reservation, comprises 656 acres on Sunapee Mountain, and was acquired by those having places nearby and through the generosity of Herbert

Welsh. It contains much fine timber and will be preserved as a demonstration forest.

The Appalachian Mountain Club has eleven small reservations comprising 750 acres, acquired to preserve spots of especial beauty to the mountain climber.

Belonging to the State are three small reservations: Monadnock, on Monadnock Mountain, comprising 600 acres; Harriman Reservation in the town of Warner, comprising 200 acres; and Haven Reservation in the town of Jaffery, comprising 100 acres—all acquired by gift to the State. These tracts should be the nucleus of planted State lands, if sufficient appropriation can be had for this purpose. The State is also engaged in taking over by Legislative Act between five and six thousand acres of the upper end of Harts Location, which we shall have the pleasure of showing you from Bretton Woods, extending as far south as Bemis Brook just below the Frankenstein Cliff, and comprising the most picturesque part of Crawford Notch. A committee of three, appointed by the Supreme Court, is now sitting to hear testimony as to values and areas, to determine the price which will be paid the owners under condemnation proceedings. After the State has acquired this land the Forestry Commission proposes to make a working plan of the age and condition of the various species of trees found thereon, and report to the Governor and Council with recommendations as to the thinnings desirable in the different sections. To assist them in this it is proposed to secure the services of a landscape architect to determine if short vistas, giving a view of the lofty side cliffs, cannot be opened up on both sides of the carriage road at advantageous places without doing injury to the now almost complete shade. It is also proposed that a suitable tablet, showing it to be a State Reservation, might be properly placed upon the cliff face at the Northern entrance, and a gateway at the South end. Paths to exceptionally fine view points ought to be constructed, and such other suggestions as would make it an attractive place to visit should be carried out by means of

a liberal appropriation at the next legislature.

The Federal Government has already purchased three distinct areas; the first of about 7,000 acres, comprising the westerly slopes of Mt. Lafayette and Mt. Garfield, through which the State road dedicated to Mr. Anderson runs between the Profile House and Twin Mountain. This, although largely cut over for soft wood, is still coming up to a fine growth, and offers much future for the practice of forestry. The second, a 30,000-acre tract, starts from a point within a short distance of the Mt. Washington Hotel and takes in the whole of Cherry Mountain, the Dartmouth Range, and the Northern slopes of the Presidential Range as far as Gorham, and contains considerable areas of old growth timber, second growth cuttings and waste lands, and much of the finest scenery in the State. The third has an area of about 35,000 acres in the valley of Wild River, somewhat off from the tourist route, but particularly desirable for its protection of the stream flow and the coming up of much young growth.

While the Federal, State and Private forces are engaged in securing themselves in the possession of land, the towns and municipalities who possess the best opportunity for doing this, have not as yet recognized the great advantage which would return to them and to the State from the purchase of their waste lands. Many lands are thrown upon the towns for taxes and could be picked up at a small figure, and if this was done no one step would go farther towards solving the future timber supply of the State as a whole. The Forestry Commission cannot too strongly recommend the town and municipal ownership of a certain portion of the State and call this to the attention of all selectmen and mayors of all cities, both because they are in a splendid position to bond for this purpose, which, if rightly handled, should yield a net income over and above the interest on such bonds, and because the town in the course of time would thereby increase its value for taxation purposes, and meanwhile furnish a labor market close at hand for its citizens. A few

cord and Nashua, have acquired land, usually for the protection of reservoirs; ten thousand acres being the total owned by towns throughout the State.

STUDY OF CONDITIONS

The State Forester has printed and distributed a pamphlet on Forest Planting. In conjunction with the Forest Service he has completed a report on the woodworking industries of our State, which will shortly come from the press. He has completed five maps of the four fire districts into which the State is divided, for the use of the service. He has made a complete map of the railroads rights-of-way throughout the State, showing the character of the growth on each side in reference to the danger from ignition by sparks from locomotives. It is interesting to note that this map shows that only about half of the 1,085 miles of railroads within the State, or 456 miles, run through woodland, and has proved of much service in narrowing down and locating the points at which fire has and will most frequently occur, and shows the necessary points at which ditching outside could be most advantageously done.

The State Forester has given thirty lectures and five fair exhibitions. Together with the members of the Forestry Commission and Mr. F. H. Billard, Forester of the New Hampshire Timberland Owners' Association, nine warden conferences have been held, with an average attendance of fifteen, at which the laws were explained and the needs of the different sections discussed, and co-operation encouraged between neighboring towns. The services of the Boy Scouts of New Hampshire have been obtained through the offer by the Forestry Commission of two gold, three silver, and five bronze medals for assistance in the apprehension and extinguishment of fire, through such rules and regulations as have been found safe and practical in other parts of the country; the committee of award to be composed of the Governor, the Chief of the Boy Scouts, and the State Forester.

An organization for fire protection has been perfected with the active

co-operation of the towns and Timberland Land Owners' Association and the Federal Service, which comprises at the present time in total 24 mountain lookout stations with watchmen, 24 regular patrol routes and 50 temporary ones at times of extreme dry weather; the distribution of 30 tool boxes containing fire-fighting tools at inaccessible points; the construction of 60 miles of telephone line; the cutting out of 29 miles of trails; the making of 12 contour maps for the mountain lookout stations, and the appointment of 224 regular and 400 deputy fire wardens in the towns of the State.

A renewal of the Federal assistance under the Weeks law was obtained of \$8,000, an increase of \$800 over the amount obtained last year.

At the close of last year's fire season a little over one thousand fires had been reported on blanks furnished the fire wardens for this purpose, of which 133 were apprehended by mountain lookouts. The majority of these fires were extinguished in their incipency, the few which got away burning over forty-two thousand acres. The wooded area of the State being reckoned at four million acres, the resulting burned area amounted to about 1%, if the land burned over was a fair average in value of the whole; this in a year which was decidedly unfavorable throughout the country. The proportionate area burned in the northern part of the State where the best patrol had been established was 7-10 of 1%, while the proportionate area in the southern part of the State was 1 3-10%, showing the efficiency directly attributable to additional patrol and watchfulness. Even with the fires confined to this small percentage of the area, the whole damage reported through the State was on this 1% of the total area, \$206,000. About \$38,000 was spent last year from all sources representing the State, the towns, the timberland owners and the Federal Government, or an insurance premium paid, we will say, of about 1-5 of 1%, so that we are led to believe that if a few thousand dollars more were spent in protection it would yield immense returns in the saving of even a portion of this \$206,000. Co-operation has been

established with the Boston & Maine Railroad during the year, leading to the appointment of Mr. E. A. Ryder at the head of a Fire Claims Department, and an agreement with the State Commission that if the crew section bosses in any towns are appointed State Deputy Fire Wardens, the railroad will take charge of all fires originating from their right-of-way, and reimburse the towns in which said fire occurs for all expense incurred in extinguishing the same. Also that all section crews will be instructed and equipped to handle fires occurring in their section; that all station agents will be instructed to post notices within stations and to actively assist in spreading alarm and securing aid and assistance in the case of fires, occurring on each side of their station; that fire signals from engines will be sounded, and that a commencement will be made towards cleaning up the slash and ditching outside of the right-of-way in dangerous places. Legislation calling for the permission and assistance of adjacent land owners in this most important work should be passed at the next Legislature. Two large mogul oil burning engines have been installed on the Maine Central Railroad to run up the heavy grade through the Crawford Notch, and it is particularly desired that this installation be extended to other branch roads throughout the State.

*An address delivered at North Woodstock, conference.

A movement towards the protection of forests from over taxation has been started at the recent convention to amend the constitution of New Hampshire, and a bill passed to amend the equal and proportionate assessment of all property for the purpose of taxation and to allow a special classification of timberland. This will enable the coming Legislature to act if it is so disposed to do. The various methods under which this could be done will be discussed at a special meeting Friday morning at the Mt. Pleasant Hotel.

The Commission regrets that it was not possible for the party to go by the way of Boscawen where the State has now some three hundred thousand transplants of White, Red and Scotch Pine, Norway Spruce, Balsam Fir, Red Oak, Chestnut and Basswood under cultivation preparatory to selling them during the coming season. The nursery distributed two hundred thousand trees during the past year, principally for planting on farms.

On the run to-morrow to Bretton Woods a few of the reservations spoken of above can be seen by the party, and some of the mountains on which lookout stations have been established, and the Commission joins with the Association in hoping that the weather, the road and the automobiles for the run be equally settled and propitious for your pleasure.

RURAL MAIL PATROL

By J. G. PETERS, *Forest Service*

THROUGH the co-operation of the Post Office Department a special order has been issued to postmasters in practically all the National Forests and in the States which have established fire protective systems to instruct rural mail carriers to report forest fires. For several years in some of the National Forests there has been informal co-operation of this nature between the rangers and mail carriers, and its effectiveness in securing increased protection has been clearly demonstrated. Now, all national and State

forest officers who have requested assistance of this kind may receive it.

The plan is for the carrier to report a fire to the nearest forest officer on his route; or, if no officer lives on the route, to have him notified by some responsible citizen. The State Foresters and National District Foresters are supplied with post maps showing the routes traversed and with Postal Guides containing the addresses of the different postmasters, who are, in turn, supplied by the Foresters with the names, addresses, and telephone call numbers of

forest officers residing on or near the carriers' routes. Thus, the carriers as instructed by the postmasters will constitute a valuable supplement to the regular patrol maintained by federal and State officers, who are often unable, through lack of numbers, to give full protection. The plan is purposely extremely simple; the carrier will not necessarily be compelled to leave his vehicle or deviate from his course.

As can readily be seen, the effectiveness of the work will depend in a large measure upon the ability of the Forest officers and the postal employees to co-operate closely. Star route contractors and carriers are not ordered, but are requested, to co-operate.

The special order is as follows:

"In accordance with the request of the Secretary of Agriculture, this Department has arranged a plan of co-operation with State and National Forest officers whereby rural and star route carriers shall report forest fires discovered by them along their routes to persons designated by the State and National authorities to receive such intelligence.

"Co-operation with State officers will be given in the following States: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, West Virginia, Tennessee, Ken-

tucky, Michigan, Wisconsin, Minnesota, Idaho, Washington, Oregon, and California.

"The National Forest officers will be co-operated with in the following States: Florida, Arkansas, South Dakota, Wyoming, Colorado, New Mexico, Arizona, Utah, Montana, Idaho, Washington, Oregon, and California.

"The State and National authorities will inform postmasters as to whom the discovery of fires should be reported, and each rural carrier should be directed to co-operate to the fullest extent with such authorities in the manner agreed upon, namely, that the carrier shall report a fire to the nearest State fire warden or National Forest officer on his route, or, if no such warden or officer lives on the route, to arrange through some responsible citizen to have him notified, by telephone, if possible. Star route contractors and carriers are included in the plan of co-operation and should be requested to report the discovery of fires in the same manner as will be done by the rural carriers.

"Postmasters in or near National Forests are also directed to report fires to the nearest Forest officer."

Respectfully,

(Signed)

P. V. DEGRAW,
Fourth Assistant Postmaster General."

THE PRESENT FIRE SEASON ON THE NATIONAL FORESTS

UP to the middle of July the forest fire losses within the National Forests during the calendar year 1912 have been unusually light. A late spring, with plentiful rain, has characterized the general climatic conditions in the West.

The most serious fire of the season so far occurred on the Olympic National Forest, Washington, where 640 acres of cedar and spruce were covered by a crown fire which killed twenty million feet of Government timber and ten million feet of private timber. It was caused by the carelessness of

settlers in burning brush, and the whole area was devastated in about two hours because a strong wind was blowing at the time. Another fire destroyed 350,000 feet on the Rainier Forest.

Outside the National Forests, especially in portions of Washington, fires have been quite frequent in old slashings.

The total number of fires within District 6, which comprises the National Forests of Oregon and Washington, reported to the middle of July, is 43, of which only the two mentioned above caused much damage.

Further south, in California, which forms District 5, 154 fires have been reported up to July 20. These burned over a total of about 6,000 acres, of which one of 4,000 and another of 953 acres, both on Kern River, did the principal damage. While the weather conditions during the early part of the season greatly reduced the fire danger, the recent reports indicate that it is increasing, nearly one-half of all the fires having occurred in the last week reported. As yet, however, the damage has not been great, and the fire organization is working splendidly.

In District 1, which includes Michigan, Minnesota, North Dakota, Montana, and northern Idaho, the weather conditions during June were again conducive to safety for the forests. The dry weather in the first part of May resulted in a number of small fires, all of which were easily controlled. In these States there is a marked tendency on the part of lumbermen, railroads, and timberland owners to improve the fire situation by taking care of slashings and railroad rights of way. The Northern Pacific Railroad Company has adopted systematic clearing of its rights of way, which will materially lessen the fire hazard. The Great Northern and the Oregon-Washington Railroad and Navigation Company have signified their intention of doing likewise. The Northern Pacific has turned over its holdings in northern Idaho within the National Forests to the protection afforded by the timber protective associations. This will greatly strengthen the protective work in Idaho.

An agreement between Montana and the Forest Service, now in preparation, provides for the protection of State lands within and contiguous to the Forests, and relieves the Service of the patrol of districts containing large tracts of State timberland, thus permitting more intensive patrol by the Service in sections hitherto inadequately protected.

Idaho and Montana are expecting to secure funds under the Weeks law to augment their share in protecting timberlands. Altogether, the situation in this District is much improved over previous years.

The notable success of the Chicago, Milwaukee, and Puget Sound Railway in keeping down forest fire loss is due to the use of oil-burning locomotives. Their adoption by other roads will greatly lessen the fires in any forested country.

Up to June 20, 38 fires occurred within the National Forests of Michigan, Northern Idaho, North Dakota and Montana. These burned over about 2,500 acres, of which less than 80 acres were covered with merchantable timber. Twenty of these fires were started by railroad locomotives, 10 by campers, 1 from careless brush burning, 1 by incendiarism, and the rest were of unknown origin. Since then about the same number of fires, mostly small ones, have been reported; one, however, covered 331 acres. So far weather conditions have been good, yet it is not expected that the whole season will be passed without some considerable losses. Much will depend upon rains and the continued co-operation of the public, especially the campers and the railroads.

In the central Rocky Mountain region, District 2, a late spring with frequent rains has up to the present time been instrumental in holding down fire loss to a gratifyingly small amount. About 50 fires, mostly small ones, have occurred, but the damage has been negligible.

A grass fire burned over nearly 31,000 acres within the Nebraska National Forest, but as is well known, this is in the barren sandhill region and is only prospective timberland, since the most of the Forest is yet to be planted to trees.

Arizona and New Mexico, in District 3, up to the present time have suffered most, except for the crown fire on the Olympic in Washington. Reporting last on July 16, the District Forester states that 236 fires have occurred, burning over altogether 46,840 acres, and necessitating an expense for fighting them of about \$5,000, exclusive of salaries of Forest officers.

The most serious fire was in the Sitgreaves National Forest, in east-central Arizona, where lightning set a fire which spread lightly over 22,560 acres, consuming the forest litter and

killing 50 per cent of the young growth, but destroying practically none of the commercial timber. Another one, which burned over 4,000 acres within the Crook National Forest, was similar in character and effect. It, too, was caused by lightning, as the great majority of the fires in District 3 have been this season. Abundant, frequent showers set in about the middle of July, as is usual in that region. The total damage from these fires has been small, since many of the most extensive ones were grass fires.

In southern Idaho, Utah, and Nevada, in District 4, late snows, a backward spring, and frequent showers have been

unfavorable to fires. Only 11 fires have been reported, and the total damage was practically nothing.

Although there is yet plenty of time for disastrous fires, the situation so far is very gratifying to the officers of the Forest Service. While frequent rain has held down the fire loss so far, it has also, in connection with a long growing season during spring and summer, caused an unusually rank growth of grass and weeds within the open stands of timber. When this vegetation becomes dried out during possible later summer droughts, the fire menace will be increased.

RESOLUTION TO THE SENATORS

Each member of the United States Senate has been sent a copy of the following resolution which was adopted at the meeting of the Board of Directors of the American Forestry Association at Bretton Woods, N. H., on July 18, and asked to give his careful consideration of it.

Whereas, amendment 85 to Agricultural Appropriation Act (H. R. 18960, 62nd Congress, 2nd Session), page 50, provides that the Secretary of Agriculture is hereby directed and required to select, classify and segregate as soon as practicable, all lands within the boundaries of national forests that are suitable and fit for agricultural purposes, and as soon as such lands have been thus selected, classified, and segregated, the same shall be open to settlement and entry under the homestead law, be it

Resolved, That the American Forestry Association, a national organization, with a membership in every State in the Union, and with which numerous

State forestry organizations are affiliated, declares that the passage of this amendment would result in abuses such as took place before the National Forests were created, that many areas covered with enormous stands of valuable timber would pass to private ownership without settlement actually taking place; that it would prevent the Secretary of Agriculture withholding from entry lands which are of great value as water-power sites, for the developments of irrigation works and other purposes, as well as lands needed for public purposes, and be it

Resolved, That the American Forestry Association, declaring that the public interests would be seriously jeopardized by the passage of the amendment in its original form, and that it would be against public policy, solicits the careful consideration, by each member of the United States Senate, of the request that the amendment shall not be passed in its original form.

STUDYING FOREST CONDITIONS IN NEW YORK

FROM statistics gathered already by the State Conservation Department," says Hugh P. Baker, dean of the New York State College of Forestry at Syracuse University, in a letter addressed to the Conservation Commission, "we know that New York now secures only about one-fourth of the wood it uses from the lands of the State, sending outside the cost price for three-fourths of its wood. This means that New York is sending into other States several millions of dollars for wood that its 12,000,000 acres of forest land could be made to produce easily under scientific forest management. Such area of forest land, if properly managed, would not only supply fully the needs of the State, but there would be a large surplus which would bring considerable money back into the State as the material is exported."

These conservation facts and conclusions, brought home to the head of the State College of Forestry at Syracuse by the Conservation Commission's investigations and bulletins, have prompted the college to inaugurate this fall "A study of the wood-working industries of New York." In announcing this plan to the Conservation Commission, Dean Baker makes the following statement, which forecasts a valuable co-operation with the State department in the practical conservation of the State's forests and lands best adapted to growing trees:

"For some time various States and the National Government have felt the necessity of taking stock both of our forests and of the wood that we are using in our manufacturing and for other purposes. Until we do know definitely as to how much we have left in our forests and how much we are using annually, can we say exactly how long our virgin forest will last and how soon we must prepare for the time when all of our forests will be so-called "second

growth." The United States Forest Service began some three years ago this stock taking as far as the wood-working industries are concerned by making co-operative studies with various States. Such studies have been made in some ten or twelve States including New Jersey, Pennsylvania, Kentucky, Virginia, Michigan, Illinois, Iowa and Washington. On July 1st the study of New York conditions was begun and the Government Service considers it so important that it will open an office in New York City so that the various parts of the State may be more effectively covered by the agents of the New York State College of Forestry and the Forest Service.

"Blank sheets and cards are being sent out to manufacturers throughout the State, asking for the kinds of wood used, for what used, form, quantity in board feet, cost per thousand, and the source of the material used. Also what attempts have been made to use waste material for purposes other than fuel. As the data is gathered it will be tabulated with the idea of determining exactly the purpose for which the various woods are most generally used, how much is being used, its cost and where the State is getting it. From statistics gathered already by the State Conservation Commission, we know that New York now secures only about one-fourth of the wood it uses from the lands of the State, sending outside the cost price for three-fourths of its wood. This means that New York is sending into other States several million dollars for wood that its 12,000,000 acres of forest land could be made to produce easily under scientific management. Such an area of forest land, if properly managed, would not only supply fully the needs of the State, but there would be a large surplus which would bring considerable money back into the State as the material is exported."

STATE NEWS

Vermont

The Republican Party in Vermont has adopted the following plank in its platform:

"The maintenance of the forests of the State is of prime importance. We believe that adequate measures should be taken by the General Assembly to safeguard the forests from insect ravages, fires and other destructive agencies; that the forestry branch of the State government should be strengthened and that forest tracts suitable for nurseries and for demonstration of the most approved forestry methods should be acquired and utilized for these purposes in various parts of the State.

"We approve the present policy of encouraging private owners to re-forest their waste lands in an intelligent manner. Conservation of such woodlands should be fostered by a liberal tax policy."

The State has just acquired two new State forests: one of between 800 and 1,000 acres, including Bald Mountain in Mendon, about three miles from the city of Rutland; the other in Townshend of about 700 acres in the beautiful West River valley of Southern Vermont. Both of these tracts are admirably located for demonstration purposes.

Colorado

Every day has been Arbor Day high up on the slopes of Pike's Peak lately. Government forestry officials have been replanting a vast area which was fire swept more than fifty years ago. Hundreds of thousands of pine seed and young trees have been planted on barren slopes, marking the first important step toward reforesting the entire Rocky Mountain range—or so much as is included in the national forests.

With the denuded areas on the slopes of the Rockies covered with a sturdy growth of young trees, the snowfall in the mountains will be much slower in melting. This will hold back the waters which now rush to the Mississippi Valley from the Rocky Mountain watershed in April and May. These late floods have done the most damage this season, as their addition to streams already bank full has proved too great a strain for levees.

Minnesota

The importance of the forests in the southeastern part of Minnesota and the opportunities for further economic value are little realized, in the opinion of W. F. Cox, state forester, who returned yesterday from an extensive trip. The forestry service has

started an investigation of the situation, looking toward the protection of the forests in that portion of the State.

"Certain counties have about half forested land, in spite of the fact the country has been settled longer than other parts of the state," said Mr. Cox. "These lands, of course, are the rougher lands, either quite hilly or lie along the bluffs of the rivers, like the Zumbro and the Cannon. The forests consist of hardwood, oaks of several kinds, maple, elm, basswood and a great variety of other kinds.

"There is an opportunity for a great many small cities and villages to own municipal forests, particularly at the source of their water supply. Such forests would pay well and at the same time keep the source of water supply free from contamination. The bluffs along some of the rivers are all particularly adapted for municipal forests. They could be bought cheaply and would make beautiful parks."

South Dakota

Two years ago the forest service seeded with pine a tract of 500 acres near Savoy in the Spearfish canyon country and results manifest thus far show that the work will prove a success. The young trees are up over the entire tract and appear to be strong and healthy. In most instances they have already attained a height of six or eight inches.

In the Redfern district, where a tract of several hundred acres was seeded at the same time, the results have not been so successful, although in many places there a new growth of pine has started, which promises to develop well. On the whole, the growth there is not as good as in the Spearfish district, but the work is far from being unsuccessful.

New York

Nearly 3,000,000 acres of land in New York State, or about 8 per cent of the total area of the State, are in immediate need of reforestation, being now without profitable growth of any kind, is the statement of the conservation commission based on a careful survey just completed.

To encourage the farmers of the State to recover these waste lands and to instruct them how to restore and handle his woodlot so as to produce the best results is one of the important undertakings of the conservation commission, which was created by Governor Dix and the Democratic legislature.

The proper care and maintenance of growing forests and the restoration of lands which have been denuded but are not available for cultivation are important to the people of the State as a whole because of the effect of the forests upon rainfall and control of streams, but the reforestation of waste tracts under conditions which have been created by the conservation commission affords an opportunity for individual profit to the farmers while working for the general welfare of the State.

California

An increase of \$48,000 in the receipts from the national forests in California for the fiscal year ending June 31, 1912, over those for the previous 12 months is shown in the annual statement of receipts just issued from the main office in San Francisco of district 5 of the United States forest service.

The total receipts for 1911-1912 were \$272,433, against \$224,531 for 1910-1911. An increase in nearly all the departments from which revenue is obtained is shown in the report, timber sales being a particular feature with an increase of \$35,000 in the past year. In this time \$119,128 worth of timber was sold, against \$84,471 during the previous fiscal year.

For settlements on timber destroyed in the building of railroads and reservoirs or otherwise, \$6,347 was received in 1911-1912, and \$4,441 in 1910-1911. For timber trespass there is a decrease, \$7,451 being collected against \$12,205 for the previous year; \$95,504 was paid for grazing privileges, an increase of \$4,000 for the last year. For water power approximately \$42,000 was received compared with \$31,000 the year before.

Kentucky

Prof. Arthur M. Miller, dean of the College of Arts and Sciences, and professor of geology at Kentucky State University, has written an interesting paper on the proposed arboretum for the Capitol grounds at Frankfort in which he points out the difficulties in the way of having each county in the State represented by a separate species of tree, and mentions the objection which any county would have to being typified by the sassafras or persimmon, everywhere standing for poor land, and the unpoetic associations of the pignut. Prof. Miller suggests that before it is too late a section of a mammoth Kentucky oak should be secured, on which, when polished as a scroll, the principal events of Kentucky's history should be recorded, making it similar to the famous tablet in the Kensington Museum in England. Prof. Miller's paper contains a striking and instructive history of the native trees of Kentucky.

Pennsylvania

Thirty-five sophomore forestry students of the Pennsylvania State College are encamped for the summer in N. P. Wheeler's "forest primeval," Forest county, under the supervision of Professor Clark, head of the Forestry Department of State College, and his assistants. Mr. Wheeler is showing them a few of the original "big sticks" and a good field is offered both for a scientific and practical study of forestry.

New York

"We have eleven million baby trees ready for distribution among the people of the State of New York," is the statement made at the New York State, Forest, Fish and Game Bureau.

These small trees are to be sold within the State at the extremely low price of \$4 a thousand.

This, it is asserted by the bureau officials, shows that New York has taken the lead in the great forestry movement that now is sweeping the whole country. It is declared these eleven million trees mean the salvation of this State in the years to come.

The bureau officials say that the spirit of conservation is manifest in all the cities as well as in the rural districts, the question being recognized as vital to the nation. New York plainly is leading the great movement.

Growth of tree culture sentiment nowhere is in greater evidence, assert the expert foresters. One tree grower wants an almost unlimited number of white pine trees from six to fifteen feet high. The stipulation is that these trees must be growing from six to twenty feet apart in a loam, preferably not more than four miles from a railroad.

Texas

Texas is the largest State and has more forested area than any other, though the total stand of its timber is much below some of the rest. The area of its woodland has been placed at about 40,000,000 acres; but it is difficult to draw the line between forested and unforested land in the State. There are all grades and degrees from the heavily timbered pine belts of the east to the thinly covered brush land in some of the central, southern and western parts. Much land is covered with tree growth and yet is incapable of producing a large amount of merchantable lumber, because the trees are too small for milling purposes. There is room for difference of opinion as to where the lines should be properly drawn between the timbered and untimbered portions of Texas. The estimate of 40,000,000 acres land includes only that which now is capable of yielding a reasonable amount of saw timber per acre and does not include wide expanses of brush.

California

A newspaper report says: A considerable fortune is being spent by wealthy Californians in an effort to save groves on beautiful estates near this city from a blight that has recently attacked most of the trees. Tree surgeons are gathering here from various parts of the country and are working hard under offers of large rewards if they can stop the destruction. Should they fail, it is probable that foresters will be brought from Europe.

The blight is in the form of a fungus known as the *volsairia* bacteria. After it has taken hold on a tree thousands of worms develop. They are much like the carpenter borer. These pierce the bark through and through, and sometimes make large holes. Their ravages were not detected until many of the fine shade trees wilted this season and were threatened with quick death. Tree authorities of Stanford University were called in and found that the blight extended among the estates in beautiful Menlo Park. They also discovered that the disease was spreading rapidly to the north.

New Jersey

The report of the New Jersey Forest Commission for 1911 is being distributed. This

shows that the chief effort of the Commission is to give value to the forests through fire control. The State owns and can own no important part of the forests within her borders, but by encouraging and helping those who do own them a better order will be established.

In New Jersey most forest fires occur in the spring, and the spring of 1911 was so exceptionally dry that the fire hazard was greatly increased. Nevertheless, the fire service which has been developed during six years succeeded in lessening the number of fires by 13 per cent., and in reducing total damage by 32 per cent. over what was suffered the previous year. In neighboring States under similar conditions the fire loss was from two to five times as great as that of the preceding season. The report points out that most of the railroads are doing their utmost to prevent fires. Their employees and the firewardens succeeded so well in meeting the situation that of 200 fires started only 17 burned as much as ten acres. A strong indication of the railroads' interest is found in the statement that they have built 235 miles of fire lines, practically voluntarily, and at their own cost. Of the 64 fires due to brush burning some were serious, though what might have happened is suggested by the showing that upwards of 2,400 brush burning permits were issued.

PRESERVATION OF MINE TIMBERS

The Forest Service has issued Bulletin 107, treating of the "Preservation of Mine Timbers." Practical methods of increasing the durability of timber are given. First, peeling is advised, by which simple and inexpensive treatment the life of timber is increased from 10 to 15 per cent. Seasoned timber, it is claimed, will last 25 per cent longer in a mine than green timber and hence it is advised that the timber be seasoned in the woods before shipping.

INVENTORY OF FOREST LANDS

In accordance with the requirement that it investigate phases of forestry of value to all the people of the State, the new State College of Forestry at Syracuse University is, taking an inventory of New York's forest lands. Although New York no longer ranks as one of the big lumber producing States, it is not without resources in its forests. Dean Baker of the College of Forestry believes that scientific management would make them vastly greater and an important benefit.

NEWS AND NOTES

Canadian Forestry Association

Much interest is being taken in the forthcoming annual meeting of the Canadian Forestry Association which will take place in Victoria, B. C., from September 4 to 6. Not for six years has the gathering been held on the Pacific Coast. The Province of British Columbia has just enacted a new timber and forestry law and is adopting a progressive attitude in regard to the conservation and proper disposal of its invaluable timber wealth. Much concern is evidenced on the Coast in regard to the new law and to modern methods of lumbering and clearing the pulp wood off the limits. A conference on farm forestry will be one of the features of the Seventh International Dry Farming Congress, which will be held in Lethbridge, Alta., from October 21 to 26. Dr. A. R. Myers, of Moncton, N. B., set out 40,000 white pine last spring and all are thriving. The owner expects to plant 50,000 more this season and 100,000 more white pine early next spring.

Boy Scouts Aiding

Nearly 100 scoutmasters representing the Boy Scouts of America in Pennsylvania, have appointed five wardens to serve during the present year.

These scoutmasters are located in various counties throughout Pennsylvania, and are empowered to exercise to the full powers of fire wardens should forest fires occur at any point within their jurisdiction.

Members of the Boy Scout troops are co-operating in the work of preventing forest fires, and it is reported much valuable work along this line has already been done by the boys.

These appointments have been made by Robert S. Conklin, commissioner of forestry of Pennsylvania, upon the suggestion of the executive officers of the Pennsylvania Chestnut-tree Blight Commission. The commission was inspired to make this suggestion by the great value of the services of the Boy Scouts in detecting the presence of chestnut-tree blight, and in reporting the location of the diseased trees to the commission. National and State authorities have heartily commended the scouts for their interest in forest conservation.

Sewall in Maine

James W. Sewall, formerly forestry manager of the Appleton & Sewall Co., of New York City, has opened an office at Old Town, Maine, where he will continue his business of the mapping or surveying of wild lands, or the estimation of timber. Mr. Appleton has been in ill health for some time and the

firm decided to give up its forestry work on that account. Mr. Sewall has with him the almost intact field force of the company.

Hickory Trees Killed

Numerous magnificent hickory trees have been killed by the pernicious hickory bark borer in the vicinity of New York City. It has destroyed thousands of trees in the central part of the State, while recent investigations show that it is at work in the Hudson Valley, near Tivoli, and probably is injurious in numerous other places. The severe droughts of the last two or three years have undoubtedly been favorable to the development of the pest, since the vitality of many of the trees has been lowered, and they have been thus rendered more susceptible to attack by insect enemies.

Wireless in Forests

Wireless telegraph stations for use in transmitting messages to rangers when forest fires are discovered are to be built on summits in various sections of Vermont. The first station is to be built on Mt. Pico, ten miles east of Rutland, at an altitude of 3,900 feet.

Other stations will be erected on mountains to the north.

Forests in China

The United States Consular Report says: Forestry is a subject in which the Chinese evince no interest, as there are no forests in that country. The Great Plain, on which Tien-Tsin is located, never had forests, being entirely of delta formation, and the mountainous regions to the north and west were denuded of their forests centuries ago. The surface soil of these mountains has been washed away, and to reforest them would be a matter of great difficulty. The only nurseryman in this consular district is F. Bade, of the Tien-Tsin Nursery Gardens, who is much interested in tree culture. He raises various shade and ornamental trees from seed, but the soil of the Great Plain is alkaline and comparatively few varieties of trees will flourish in it. A British corporation engaged in mining and shipping has a concession for coal mining in the Kaiping district, about eighty miles northwest of Tien-Tsin. The surface of the region is broken by hills from fifty to two hundred feet high, which are absolutely bare of trees, and the company has begun work of afforestation. It already has 1,000,000 young trees growing, chiefly acacia, and is preparing to establish a nursery for them on an extensive scale.

New York's Oldest Tree

The oldest tree on the Island of Manhattan, one that is declared to be more than 303 years old, has had its identity established and the authenticity of its age proved by the city administration after a thorough investigation into its right to be called the oldest inhabitant.

This is the discovery of a living tree that flourished when Hendrik Hudson in the good ship Half Moon sailed up the river which was to receive his name.

The city has taken this tree under special care and henceforth it is to be guarded from vandalism and as much as possible from the ravages of insect warfare and the natural process of decay.

The tree is a tulip, and a giant at that. The trunk at the base is about 24 feet in circumference. The trunk bifurcates eight feet from the base. Its top reaches up about a hundred feet and near the top it spreads out like a big elm with generous shade.

It is the only tree so far as known that existed before the first Hollanders set foot on Manhattan soil.

Reforestation at the Capital

Reforestation of the Capitol grounds by prominent statesmen is the latest fad at Washington. The old German custom of planting a tree every time one is destroyed has been inaugurated, and there is a rush among Congressmen for planting privileges.

A purple beech that grew in northern New York, near the home of Vice-President Sherman, now adorns the Capitol grounds, near Delaware avenue and B street northeast, at the brow of the hill on the north drive.

Other public men, including Speaker Clark, former Speaker Cannon and a number of prominent candidates, will be invited to plant trees, and there promises to be a lively arbor campaign. Among the trees that will be planted are the walnut, hickory and red oak, each man selecting the tree under which he loved to linger in his boyhood.

Superintendent Elliott Woods is providing photographs of the recent tree planting, to be filed away with the official records, and reforestation is now having its innings on the Capitol grounds.

Boy Scouts to Save Trees

The Boy Scouts of America have leagued themselves together as an army to save the trees and shrubs of America from insects and diseases. The work started in Pennsylvania, where thousands of chestnut trees are being destroyed. The boys have been of great help to the Forestry Department in detecting this disease and reporting the trees thus afflicted to the department.

That work afforded an excellent piece of scouting for boys, and the result has been that Boy Scouts throughout the country have written to James E. West, Chief Scout Executive of the Boy Scouts of America, asking for information about other diseases and insects that attack trees and shrubs. As a result George H. Merritt, one of the secretaries employed by the Boy Scouts of America, is compiling, with the aid of Gifford Pinchot, former United States Forester, and member of the National Council of the Boy Scouts of America, a chapter for the manual and for the scoutmasters, outlining different diseases of the most important trees.

Appointed as Forester

E. C. M. Richards has been appointed temporarily as forester of the Park Department of Queens Borough, New York. The examination for a permanent appointee will be held in the near future. Mr. Richards was graduated from the Sheffield Scientific School and from the School of Forestry at Yale University.

A New Douglas Spruce

Arthur Smith, of Reading, Pa., writes that a French explorer, Dr. Dode, has discovered a new species of *Pseudotsuga*, the habitat of which is a limestone district, 8,000 feet above the sea, in the province of Yunnan, China. It is reported to be closely allied to *Pseudotsuga Japonica*, Beissner, a native of Japan and Formosa, with which it agrees in having its leaves emarginate at the apex, but differing in having larger cones and seeds, with more numerous scales. The new species has been named *Pseudotsuga sinensis* Dode, and it appears probable that it will prove a valuable addition to our cultivated forest trees.

May Form Forest Protective Association

Wisconsin paper and pulp manufacturers are interested in a movement started at a meeting held at Oshkosh, looking toward the formation of a forest protective association operative in the northern forests of Wisconsin. Several of the companies were represented at the meeting. Lumbermen and timber land owners predominated, however. After debating and discussing the question one entire day, the meeting voted that preliminary steps be taken in the matter of forming a definite organization. More than a half million acres of timber land were spoken for at the meeting, and it is believed that this amount can be more than doubled when active organization work is undertaken.

EDUCATIONAL

Appointments at Syracuse

Since Dr. Hugh P. Baker, formerly in charge of the Department of Forestry at the Pennsylvania State College, took charge of the New York State College of Forestry at Syracuse University on April 1st, the following additions have been made to the Forestry Faculty:

Professor Frank F. Moon, who for the past two years has been in charge of Forestry at the Massachusetts Agricultural College, comes to the College as Professor of Forest Engineering. Professor Moon is a graduate of Amherst College and the Yale Forest School, 1909. After working for the Forest Service in Texas, he was appointed Forester of the Highlands of Hudson Forest Reservation, and while connected with the Forest, Fish and Game Commission of New York, prepared a bulletin on the Forest Conditions of Warren County, New York. Professor Moon will spend the coming summer in Germany.

Professor Philip T. Coolidge, who has been Director of the Forest School of Colorado College, will take charge of the Ranger School of the New York State College of Forestry on July 1st. Professor Coolidge is a graduate of the Harvard Forest School and after two years' work with the Government in the West, took charge of the Colorado School of Forestry, which he has brought to high efficiency.

Professor Nelson C. Brown, who has been teaching in the Department of Horticulture and Forestry in the Iowa State College during the past year, takes up work with the College on July 1st as Assistant Professor of Forest Utilization. Professor Brown was graduated from Yale University in 1906, and from the Forest School in 1908. During 1908 he was Forest Assistant on the Absaroka Forest in Montana and in 1909 became Deputy Supervisor on the Gallatin Forest. During a portion of 1910 Professor Brown was an instructor in the Yale Forest School Camp at Milford, Pa., and in the fall of 1910 was assigned as Deputy Supervisor on the Kaniksu National Forest.

Professor John W. Stephen, who had been a Forester with the Forest, Fish and Game Commission of New York since the spring of 1908, came to the College of Forestry on April 15th as Assistant Professor of Silviculture. Professor Stephen is a graduate of the University of Michigan, and in 1907 received from that Institution the degree of M. F. During 1907 and 1908 Professor Stephen was in charge of the Michigan Forest Reserve and during the same year acted as Instructor in Forestry in the Uni-

versity of Michigan. Since taking up work in New York, he has had much to do with the planting of waste lands in the Adirondacks and developed the State Nursery at Salamanca. While connected with the State he published a report on a Forest Survey of Oneida County, New York, and on the Basket Willow Industry of the State.

In the fall of 1912 Professor Edward F. McCarthy came to the College of Forestry as an Assistant Professor, and will have charge of the work in Dendrology and Wood Technology. Mr. McCarthy graduated from the Forest School of the University of Michigan in 1911, and during his last year there assisted Professor Roth in the course in Technology. During 1910 he was employed by the Ohio State Forestry Department and in June, 1911, became a Forest Assistant on the Caribou Forest in Idaho.

Students in the Forest

The students of the Forestry Department of the Missouri Agricultural College are making a study during the summer months of the forest conditions in the pine forests of Shannon County. A camp has been established near Eminence on the Current River on the holdings of the Missouri Lumber and Mining Company, of which Capt. J. D. White, the president of the National Conservation Commission, is the president and general manager. The students live in tents, cook their own meals and by "living next to nature" learn to be "woods wise."

Biltmore Doings

The Biltmore Forest School students leave Cadillac on the 6th of August, for the western headquarters, established since 1911, on the holdings of the famous C. A. Smith Timber Co. at Marshfield, Oregon. En route to the West, they will visit the National forests and the logging operations in Idaho and on Puget Sound, and are looking forward, with keen anticipations, to the lessons of the West in practical American forestry. Their address, after August 18th, is Marshfield, Oregon.

The degree of Bachelor of Forestry was granted, upon the completion of the statutory conditions, to G. W. Thompson and J. K. Esser, in the U. S. Forest Service; R. V. Myers, with the Champion Lumber Company; Harry S. Welby and Hubbard Hastings, with the C. A. Smith Timber Co.; P. A. Guibord, with the Laurentide Paper Company; Christopher Swezey, with the American Forestry

Company; and H. H. Goodale, with the Paul Lumber Company.

The degree of Forest Engineer was conferred on A. H. King, N. Y. State Forester, Biltmore, B.F., 1909, on a thesis entitled: "The Growth of Spruce in Maine."

S. S. Converse, Biltmore, 1912, was married to Miss Alice Merle King, daughter of Mr. and Mrs. H. W. King, at East Longmeadow, Mass., on June 12th, 1912. Converse has accepted a position with the Diamond Match Company. We congratulate Milo most heartily.

Irving Southworth is employed on the Plumas Reservation in California.

W. W. Watkins, Biltmore, 1910, is again in the tie business for the Joyce-Watkins Co., with headquarters at Nashville.

D. E. Lauderburn, Biltmore, 1905, is a member of Vitale and Rothery, Forest Engineers, with offices at 1133 Broadway, New York.

Raymond Mount, Biltmore, 1908, is Vice-president of the Gillette-Mount Lumber Company, at 50 Church Street, New York

AMERICAN FORESTRY ASSOCIATION ENDORSED

The following resolution was presented and adopted at the meeting of the Society for the Protection of the New Hampshire Forests at Bretton Woods, N. H., on July 19:

Whereas, The American Forestry Association, the only national public service organization devoted to the cause of forest conservation, has been of great service to New Hampshire, as well as many other States, in working for desirable forest legislation, and ma-

terially aids in the effort to secure forest reservations, be it

Resolved, That the Society for the Protection of New Hampshire Forests urges its members to give their active support to the American Forestry Association, and to aid it in the important and patriotic work it is doing for forest conservation, by becoming members of the American Forestry Association and subscribers to its magazine.

CITIZENSHIP AND FOREST FIRES

The Oregon Forest Fire Association has posted a new forest fire warning throughout the timbered counties. It reminds the reader that good citizenship demands the observance of the forest fire laws, and that a little care may result in the saving of thousands of dollars, for the forests of Oregon distribute more wealth in the State than grain, fruit, vegetables and fish combined. This warning also calls attention to the fact that Oregon timber owners pay more than one-third the taxes of the State.

ANOTHER WOOD WASTE ELIMINATED

By a series of experiments extending over the past six years, the Department of Agriculture has found that California grapes packed with a filler of redwood sawdust keep better and longer in cold storage than when packed in ground cork.

Redwood sawdust has been found to be peculiarly adapted to use in fruit packing, as it is more nearly neutral in odor and flavor than even ground cork and therefore does not impart its taste or odor to the fruit, as would the sawdust from other kinds of wood.

CURRENT LITERATURE

MONTHLY LIST FOR JULY, 1912

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole

Proceedings and Reports of Associations, Commissions, Forest Officers, etc.

Forestry association of Vermont. Proceedings, 1911. 31 p. Burlington, Vt., 1912.

India—Ajmere-Merwara—Forest dept. Annual report on forest administration for 1910-1911. 30 p. Mount Abu, 1911.

India—Punjab—Forest dept. Progress report of forest administration for the year 1910-11. 74 p. Lahore, 1911.

Indo-China, French—Service forestier. 10th Rapport annuel sur l'organisation et le fonctionnement du service. 40 p. 1910-11. Hanoi, 1911.

Interstate conference on forestry, Sydney, 1911. Report of the proceedings. 52 p. Sydney, Australia, 1912.

Massachusetts forestry association. Register for 1911. 45 p. Boston, 1911.

Ontario—Dept. of lands, forests and mines. Report for year ending 31st October, 1911. 114 p. Toronto, 1912.

Society for the protection of New Hampshire forests. Tenth annual report, 1911. 106 p. pl. Concord, N. H., 1911.

Forest Aesthetics

Street and park trees

Cromie, George A. and Filley, Walter O. The planting and care of street and highway trees. 19 p. pl. New Haven, Conn., 1912. (New Haven—Civic federation. Document no. 8.)

Forest Education

Forest schools

Colorado college—Dept. of forestry. Announcement, 1912-13. 23 p. pl. Colorado Springs, 1912.

Hawes, Austin F. A summer school of forestry and horticulture, to be held at the Downer state forest, Sharon, Vt., Aug. 13 to 24, inclusive, 1912. 10 p. pl. Burlington, Vt., 1912. (Vermont—Forest Service. Publication no. 10.)

Arbor day

Illinois—Dept. of public instruction. Arbor and bird day, 1910. 76 p. il. Springfield, Ill., 1910.

Forest Botany

Trees, classification and description

Elliott, Simon B. The important timber trees of the United States; a manual of practical forestry. 382 p. pl. Boston, Houghton Mifflin Co., 1912.

Garman, H. The catalpas and their allies. 21 p. il., pl. Lexington, Ky., 1912. (Kentucky—Agricultural experiment station. Bulletin 164.)

Johns, Chas. Alexander. British trees, including the finer shrubs for garden and woodland. 285 p. il., pl. London, G. Routledge & Sons, 1911.

Maiden, J. H. The forest flora of New South Wales, pt. 47. 22 p., pl. Sydney, Gov't printer, 1912.

Silvics

Studies of species

Loughbridge, R. H. Tolerance of eucalyptus for alkali. 71 p., il. Sacramento, 1911. (California—Agricultural experiment station. Bulletin 225.)

Forest Protection

Insects

Hole, R. S. Bark-boring beetle attack in the coniferous forests of the Simla catchment area, 1907-1911. 21 p. Calcutta, 1912. (India—Forest dept. Forest bulletin 10.)

Iyer, V. Subramania. A further note on some Casuarina insect pests of Madras. 9 p., pl. Calcutta, 1912. (India—Forest dept. Forest bulletin no. 11.)

Snyder, T. E. Insect damage to mine props and methods of preventing the injury. 4 p. 8" Wash., D. C., 1912. (U. S.—Dept. of Agriculture—Bureau of entomology. Circular 156.)

Fire

Potlatch timber protective association. Annual report, 1911. 19 p. Potlatch, Idaho, 1912.

Forest Management

Appleton and Sewall Co., inc. Applied forestry; written particularly for owners and managers, explaining certain methods of foresters toward conserving property values and providing maximum returns from current operations. 34 p. il. N. Y., 1912.

Baker, J. Fred. The Michigan woodlot. 14 p. il. East Lansing, Mich., 1912. (Michigan—Agricultural experiment station. Circular 17.)

Forest mensuration

French, Truman R. French's scientific timber cruiser; a compendium of valuable information for cruisers or estimators of timber, sawyers, millmen or owners of timber lands. 36 p. il. Los Angeles, Cal., T. R. French, 1910.

Forest Engineering

Surveying and mapping

United States—Dept. of agriculture—Forest service. Signs, symbols and colors; supplement to the Instructions for making forest surveys and maps. 12 p. il., map. Wash., D. C., 1912.

Forest Utilization

Lumber industry

Bryant, R. C. An outline for a field study of a lumber operation. 24 p. New Haven, Conn., 1912.

Wood-using industries

Maxwell, Hu and Hatch, Chas. F. The wood-using industries of Texas. 18 p. New Orleans, La., Lumber trade journal, 1912.

Forest by-products

Cross, C. F., and others. Wood pulp and its uses. 270 p. il. N. Y., D. Van Nostrand Co., 1911.

Pearson, R. S. Commercial guide to the forest economic products of India. 155 p. pl., map. Calcutta, India, Supt. govt. printing, 1912.

Thickens, J. H. Experiments with jack pine and hemlock for mechanical pulp. 29 p. pl. Wash., D. C., 1912. (U. S.—Dept. of agriculture—Forest service.)

Wood preservation

American wood preservers' association. Proceedings of the 8th annual meeting held at Chicago, Jan. 16-18, 1912. 302 p. il. Baltimore, Md., 1912.

Auxiliary Subjects

National parks

United States—Dept. of the Interior—Office of the Secretary. General information regarding Crater Lake national park, season of 1912. 10 p. maps. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Glacier national park, season of 1912. 9 p. map. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information

regarding Mesa Verde national park, season of 1912. 24 p. il. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Mount Rainier national park, season of 1912. 19 p. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding the Sequoia and General Grant national parks, season of 1912. 22 p. map. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Yellowstone national park, season of 1912. 30 p. maps. Wash., D. C., 1912.

United States—Dept. of the Interior—Office of the Secretary. General information regarding Yosemite national park, season of 1912. 22 p. map. Wash., D. C., 1912.

Periodical Articles

Miscellaneous Periodicals

American city, April 1912.—Protection of shade trees against insects, by A. T. Hastings, p. 644-6; Caring for twenty-three hundred elm trees, by C. F. Lawton, p. 656.

American city, May 1912.—Insects and shade trees, by E. P. Felt, p. 731-2.

Annals of American academy, May 1912.—Timber bond features, by T. S. McGrath, p. 1-8, suppl.; Science of timber valuation, by J. D. Lacey, p. 9-22, suppl.; Questions of law encountered in timber bond issues, by E. E. Barthell, p. 23-44, suppl.; Accountant's relation to timber bond issues, by A. F. Jones, p. 51-8, suppl.; Waste material as a source of profit and added security on timber bonds, by W. J. Cummings, p. 76-80, suppl.

Breeder's gazette, July 10, 1912.—Forest service range reconnaissance, by Arthur D. Read, p. 50-1.

Gardners' chronicle, June 8, 1912.—Humus, by Alger Petts, p. 373.

Harpers' magazine, July 1912.—The secret of the big trees, by Ellsworth Huntington, p. 292-302.

National geographic magazine, June 1912.—Our national parks, by L. F. Schmeckebier, p. 531-79; Scenes among the high Cascades in central Oregon, by Ira A. Williams, p. 579-92; The great white monarch of the Pacific northwest, by A. H. Barnes, p. 593-626.

National wool grower, June 1912.—Range improvement and methods of handling stock in national forests, by J. T. Jardine, p. 7-10.

Outing, June 1912.—Windbreaks for the country home, by E. P. Powell, p. 372-6; Profit from trees on waste land, p. 377-8.

Outlook, May 25, 1912.—Something of a problem; forest rangers, by C. H. Shinn, p. 174-80.

- Overland monthly, May 1912.—Conservation and the farmer, by C. B. Lipman, p. 473-8.
- Plant world, July 1912.—The behavior of the nectar gland in the cacti, by Francis E. Lloyd and Chas. S. Ridgway, p. 145-56.
- Quarterly journal of economics, May 1912.—Lumber grading in the Pacific northwest, by V. Curtis, p. 538-44.
- Scientific American, May 11, 1912.—Zapote tree as a source of chicle, p. 528.
- Scientific American, May 18, 1912.—Most expensive wood in the world; cabole, p. 444.
- Scientific American, May 25, 1912.—Method of making pulp lumber, by M. T. S., p. 475.
- Scientific American, June 15, 1912.—How we can utilize \$250,000,000 worth of wasted timber, p. 537, 547-9.

Trade journals and consular reports

- American lumberman, June 15, 1912.—Incidental features of logging operations, p. 58-9.
- American lumberman, June 29, 1912.—Some construction timbers of the Philippines; tanguile, by H. N. Whitford, p. 37.
- American lumberman, July 6, 1912.—Some construction timbers of the Philippines; apitong, by H. N. Whitford, p. 29; Durability of wood, p. 29; Merits of wood blocks for street paving, p. 49.
- Canada lumberman, June 15, 1912.—Modern methods of timber estimating, by T. Read, p. 48-9.
- Canada lumberman, July 1, 1912.—Interesting facts about timber cruisers, p. 50-2.
- Engineering magazine, May 1912.—Refractory building material; a new non-combustible wood substitute for building purposes, by C. L. Norton, p. 279-81.
- Hardwood record, June 25, 1912.—Forests as climate regulations, p. 31; Increasing kiln capacity, p. 32-3; Cell structure of oak and gum, p. 33-4; Forest fires; what they cost, how they start, how to prevent them, by Chas. H. Flory, p. 35; Wooden pails and shoe pegs, p. 38-9; Cherry birch for gunstocks, by S. J. R., p. 39; Burls and bird's-eye, by S. J. R., p. 41-2.
- Hardwood record, July 10, 1912.—Making wood distillation history, p. 26-8; Yellow poplar and cucumber, p. 33; Splash damming on the Big Sandy, p. 34a-36.
- Lumber world review, June 10, 1912.—Forestry work in the state of Massachusetts, by John M. Woods, p. 19-20; Sugi finish applied to cypress, p. 18-19, 27.
- Naval stores review, June 27, 1912.—The naval stores industry of France; its origin, development, acreage, annual crops, home consumption and exports, p. 3-13; The working of the French pine forests; the prices of turpentine; the values of the lands, p. 13-14; What the maritime pine has done for France, p. 16-22; The maritime pine in the United

States, p. 26; The naval stores industry in Spain, p. 28-31; The naval stores industry in Greece, p. 33-4; Developing naval stores industry in Japan; worked in a petty way by numerous small farmers, p. 34; Rosin production in Prussia, p. 50.

- Paper, July 3, 1912.—Bamboo as papermaking material, by William Raitt, p. 17-18; Forest workers in Germany, p. 19.
- Paper, July 10, 1912.—Mechanical pulp from Jack pine and hemlock, p. 15-16; Wood-pulp yarn; its manufacture and uses, by W. P. Dreaper, p. 17-18.
- St. Louis lumberman, June 15, 1912.—The Yale forest school in Arkansas, p. 79.
- Southern industrial and lumber review, June 1912.—Standing timber values; Texas forests and their values, by F. A. Briggs, p. 37.
- Southern lumber journal, June 15, 1912.—Wood for car wheels; timber faults pointed out by odd names to the wheelwright, p. 35.
- Southern lumberman, July 13, 1912.—Methods for utilization of wood waste, by George Walker, p. 41-2.
- Timberman, June 1912.—Practical forestry schools have ever broadening field of usefulness, p. 20-1.
- United States daily consular report, June 20, 1912.—Chinese wood oil, by Roger S. Greene, p. 1226-7.
- United States daily consular report, June 30, 1912.—Russian state forests, by John H. Grout, p. 1231.
- United States daily consular report, July 12, 1912.—Chinese lackwood furniture, by George E. Anderson, p. 202-3.
- Wood craft, July 1912.—Varying characteristics of the same woods, by Samuel J. Record, p. 108; Various tables; their development, design and construction, by John Bovingdon, p. 110-13; Microphotographs of the structure of wood, p. 114-15; Refractory woods and some substitutes for them, by Chas. L. Norton, p. 116-18.
- Wood-worker, June 1912.—Manufacturing piano sounding boards, by E. E. D., p. 27; Relative merits of red and white oak, by George Keller, p. 35-6; The Hawaiian cabinet wood, Acacia koa, by J. S. Bailey, p. 40.

Forest journals

- Allegemeine forst-und jagd-zeitung, May 1912.—Wald und sturm, by Vogl, p. 145-51; Forstliche reisenotizen aus Südtalien, by A. Müller, p. 151-5; Die normalertragstefeln im dienste der praxis, by Eberhard, p. 155-62.
- Allegemeine forst-und jagd-zeitung, June 1912.—Die fürstlich Isenburgischen waldungen bei Birstein, by Reiss, p. 181-96.
- Canadian forestry journal, May-June 1912.—A forestry students' camp, by R. B. Miller, p. 59-61; Les usages du Bouleau à papier, p. 62-3; Quebec Province starts forest planting, p. 63-5; Our forest re-

- serve problem, by J. R. Dickson, p. 66-71; Measures for the prevention of forest fires, by M. Kienitz, p. 74-8.
- Centralblatt für das gesamte forstwesen, May 1912.—Versuche über individuelle auslese bei waldbäumen, by E. Zederbauer, p. 201-12.
- Forestry quarterly, June 1912.—National forest timber sale contract clauses, by Theodore S. Woolsey, p. 139-83; Light burning versus forest management in northern California, by Richard H. Boerker, p. 184-94; The effect of forest fires on trees and reproduction in southern New England, by P. L. Buttrick, p. 195-207; How the insect control problem compares with the fire problem on national forests in District 5, by John M. Miller, p. 208-14; A new method of constructing volume tables, by Donald Bruce, p. 215-21; Rainfall a factor of tree increment, by Francis Davis, p. 222-8; The equipment and operation of a Prussian seed extracting establishment, by A. B. Recknagel, p. 229-34; North American species in Hungary, by Karl Petraschek, p. 235-6; Girdled trees, p. 237; Two minor wood industries, by C. S. Judd, p. 238-42.
- Forstwissenschaftliches centralblatt, May 1912.—Der gegenwärtige stand der humussäurefrage, by H. Bauer, p. 247-54; Über das sichlichten und die behandlung älterer kiefernbestände, by C. Frömbling, p. 254-62.
- Indian forester, May 1912.—The need of fire-protection in the tropics, by C. E. C. Fischer, p. 191-221; Peridermium cedri as a destructive fungus, by R. S. Troup, p. 222-3.
- Revue des eaux et forêts, June 1, 1912.—Conifères; essais de table aux dichotomiques pour la détermination des espèces, by L. Pardé, p. 340-1; Mouvement forestier a l'étranger; Autriche, by G. Hufel, p. 342-4.

E. T. ALLEN VISITS SOUTH SEA ISLANDS

Completing on ocean trip of some 8,860 miles, E. T. Allen, forester of the Western Forestry and Conservation Association, has returned from Tahiti, and again taken up the great work of forest fire prevention. Mr. Allen contracted the Society Island habit some years ago. On his return to Portland after this last trip he said the South Sea Islands looked better than ever before, with crop prospects down there indicating a probable increase in the use of fir from Oregon and Washington.

